Cajun™ P550®/P880 Switch ATM Uplink User Guide

Version 1.1

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Cajun™ P550®/P880 Switch ATM Uplink User Guide, Version 1.1

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Preface

This guide explains how to configure and operate the Cajun™ P550®/P880 ATM Uplink module (referred to as the ATM Uplink module).

Overview of the Contents

This guide contains the following chapters:

Chapter 1, Overview of the Cajun ATMUplink Module - Provides an overview of the features and functionality of the AT Uplink module.

Chapter 2, Configuring the Cajun ATM Uplink Module - Describes how to perform the initial configuration of your ATM Uplink module and configuration pertaining to both LANE (LAN Emulation) and RFC 1483.

Chapter 3, Configuring LANE - Describes how to configure your ATM Uplink module in an ATM Forum LANE environment.

Chapter 4, Configuring 1483 - Describes how to configure your ATM Uplink module using RFC 1483 standards.

Chapter 5, Command Line Interface Commands - Provides description of the CLI commands associated with the ATM Uplink module.

Technical Support

To contact Avaya's technical support:

- From the United States:

  1-800-237-0016

- Outside the United States:

  Contact your distributor.

Conventions

This section describes the conventions used in this document.

Text Conventions

This document uses the following text conventions:

Convention	Represents	Examples
User Input	User entered text.	To enable the network, enter: **`set network enable`**
Boldface Text	Menu command, keyword to be acted upon, or button name.	From the Interface pull-down menu, select **Default**. Click **Cancel** to cancel the installation.
System Output	Text displayed by the system.	If you enable the network successfully, the following output displays: `ATM(configure)#` **`set network enable`** `Network has been enabled`
Note	Provides additional information about a procedure or topic.	*** Note:** In order to change the virtual port parameters, the Administrative Status state must be **Down**.

Convention	Represents	Examples
Caution	Indicates a condition that may damage hardware or software.	 CAUTION Ensure that all adjacent modules are seated and the captive screws secured. Failure to do this may result in difficulty installing other modules into the chassis.
Warning	**Indicates a condition that may cause** *bodily injury* **or** *death***.**	 WARNING This unit has more than one power-supply cord. Disconnect all power cords BEFORE servicing to avoid electric shock.

Related Documentation

This section provides information on related documentation, including:

- Online Documentation
- Avaya Documentation
- Installation Sheet
- Documentation Feedback
- ATM Forum - http://atmforum.com

Online Documentation

Avaya maintains copies of technical documentation on the Avaya Web server. To access online documentation, including HTML and PDF documents, use Netscape Navigator® version 4.5 or higher or Microsoft® Internet Explorer version 3.x or higher and enter the following URL:

http://pubs.avayactc.com

Online Help

You must have a browser installed on your system in order to use the online help. The following browsers are supported:

- Netscape Navigator 4.5 or later
- Microsoft Internet Explorer 3.0 or later

*** Note:** If you are using Netscape®, use version 4.5 or later. Also, you must configure the Proxies to:

Direct Connection to the Internet.

Open:

Edit > **Preferences** > **Advanced** > **Proxies**

and verify that the **Direct Connection to the Internet** button is selected.

When launching the online help, wait until the help window has completely loaded before resizing the window.

Installing Online Documentation and Help Files

Certain resources used by the Web Agent are located off the switch to preserve switch memory. Setting up a help server location for the switch allows the switch to access:

- Online documentation
- Bitmaps used as part of the interface (logo, wallpaper)
- Online help files for the Web Agent

You can access online documentation and help files used by the Web Agent by either:

- Installing the Avaya HTTP documentation server (available on the Avaya user documentation CD, CajunDocs)
- Adding the files to an existing web server on your network

Installing the Avaya HTTP Documentation Server

You can access online documentation and help files directly fro the HTTP documentation server. The server must be running a Win32 compatible operating system (for example, Windows 95, Windows 98, or Windows NT).

To install the help server, you must perfor **one** of the following:

- Run the **Setup** program from the CajunDocs CD-ROM.

  Or

- Complete the following steps:

  1. Go to the Avaya Publications Web site:

     http://pubs.avayactc.co

  2. Select the latest released version of the CajunDocs CD.
  3. Run the **Setup** program (setup.exe). This extracts the help server and the online help system.

Starting the Avaya HTTP Web Server

To run the Avaya HTTP help server after you have installed the help server:

1. Open your system's (Win9x/NT) Start Menu.
2. Select the **CajunDocs** program group.
3. Select the document server from that program group.

The Avaya document server launches. To access this server from a Web browser, you need to set a server location on the switch, as explained in "Entering the Server Location at the Switch", later in this Preface.

Entering the Server Location at the Switch

To set the location of the documentation server:

1. Launch your Web browser and connect to your switch.
2. Enter your **user name** and **password** at the respective prompts.
3. Click **OK**. The General Information screen opens.
4. Select **System > Administration > Online Help** from the switch Web Agent. The Online Help Configuration dialog box opens (Figure 1).

Figure 1. Online Help Configuration Dialog Box

5. Enter the **host name** or **IP address** of the HTTP server in the HTTP Server Location field followed by the port designation of *:2010*. For example, the correct syntax for host named phantom is:

   http://phantom:2010

   *** Note:** The default port number for HTTP is port **80**. The default port number for Telnet is **23**. If you decide to install your online help on a Web server other than the Avaya HTTP server bundled on the CajunDocs CD-ROM, you can specify the URL without a port number if your Web server runs on port 80. For example:

   http://www.companynamehere.com.

6. Click **Apply** to accept the HTTP Server Location you entered or **Cancel** to restore the previous settings.

Adding the Document Files to an Existing Server

You can install the online help to a Web server other than the Avaya HTTP server bundled on the CajunDocs CD-ROM. You must transfer the help subdirectory to that Web server and enter the URL for that web server in the Server Location field.

To transfer the CajunDocs help directory to your company server (http://www.abc-company.com):

1. Install the online help and documentation from the CajunDocs CD to a Windows 95, 98, or NT node on your network.
2. Transfer the entire help subdirectory located in **C:\CajunDocs** to the root directory of your Web server
3. Launch your browser and connect to your switch.
4. Enter your **user name** and **password** at the respective prompts.
5. Select **System > Administration > Online Help** from the switch Web Agent. The Online Help Configuration dialog box opens (Figure 1).
6. Enter the **server location** in the HTTP Server Location field. For example:

   http://www.abc-company.com).
7. Enter the **directory name** of your help files in the HELP Directory Location field. For example:

   help

   *** Note:** The default for the help directory is **help**. You do not need to change this unless you changed the name of your help directory prior to transferring it to your Web server.
8. Click **Apply** to accept the HTTP Server Location you entered or **Cancel** to ignore the location.

Downloading an Updated CajunDocs CD from the Internet

The server and help files are available on the Internet. To download updated files from the Internet to your CajunDocs CD directory:

1. Launch a web browser.
2. Go to the **CajunDocs Installer** Web page:

   http://pubs.Avayactc.co

3. Select the latest version of the CajunDocs CD-ROM installer to download into the directory you previously created.

For more information on this product, refer to the online documentation that comes on your CajunDocs CD-ROM or refer to:

`http://pubs.avayactc.com`

to review the online documentation there.

Avaya Documentation

The following document provides additional information on Avaya products:

- *Cajun P550/P880 ATM Uplink Module Installation Sheet* - Describes how to install the ATM Uplink module into the Cajun switch.
- *Cajun P550/P880 ATM Uplink Module Release Notes* - Provide the latest information on the ATM Uplink module, known problems and workarounds, and functional restrictions.
- *Cajun P550R/P880/P882 Installation Guide* - Describes how to install and set up the family of Cajun switches.
- *Cajun P550R/P880/P882 Switch User Guide* - Describes how to operate, configure, and maintain the family of Cajun P550R/ P880/P882 switches.

Documentation Feedback

If you have comments about the technical accuracy or general quality of this document, please send us an email at:

`techpubs@avaya.com`

Please cite the document title, part number, and page reference, if appropriate.

ATM Forum

For more information about ATM, refer to the ATM Forum Web site:

http://www.atmforum.co

Avaya Products and Services

For information about Avaya products and services, please consult the Avaya World Wide Web site at **http://www.avaya.com**.

1 Overview

ATM Uplink Module Overview

The ATM (Asynchronous Transfer Mode) Uplink module provides LAN Emulation (LANE) or RFC 1483 connectivity over an AT network. The module comes in four variants:

- 2-port SONET (Synchronous Optical NETwork)/SDH (Synchronous Digital Hierarchy) OC-3c/STM-1 SMF (Single Mode Fiber)
- 2-port SONET/SDH OC-3c/STM-1 MMF (MultiMode Fiber)
- 2-port SONET/SDH OC-12c/STM-4c SMF
- 2-port SONET/SDH OC-12c/STM-4c MMF

Each module has multiple physical interfaces capable of being simultaneously active.

Table 1-1 lists the modules wavelengths.

Table 1-1. Wavelength

Module	Wavelength
OC-3 MMF	1300nm/2 K
OC-3 SMF	1300nm/10 KM
OC-12 MMF	1300nm/500 M
OC-12 SMF	1300nm/10 KM

The major features of the ATM Uplink module are:

- LANE V2 Client - with LANE 1 compatibility, supports up to 128 switch ports
- QoS (Quality of Service) support for Unspecified Bit Rate (UBR), non real-time Variable Bit Rate (nrt-VBR), real-time Variable Bit Rate (rt-VBR), and Constant Bit Rate (CBR)

- ATM UNI (User-to-Network Interface) version 3.0, 3.1 and 4.0 signaling
- ILMI (Integrated Local Management Interface) version 4.0
- PNNI (Private Network - to - Network Interface) non-transi mode
- Link Failover (UNI only)
- Spanning Tree (LANE only)
- RFC1483
- Random Early Detection (RED)
- Multiple ATM Uplink modules in one chassis

*** Note:** All ATM protocols are ATM Forum standard.

Communications Overview

Ethernet attached devices communicate across an ATM network using LANE or RFC 1483. The Cajun ATM Uplink module supports LANE V2 clients enabling interoperability with LANE V1 networks. Each Cajun ATM Uplink module has multiple physical ports. Each of these ports can connect to any network node of an ATM cloud. Depending on configuration, the links act as primary and backup links, or connections are load shared across all of the ports.

LANE

The basic function of the LANE protocol is to simulate a connectionless LAN service over a connection-oriented ATM network. There are four basic components of LANE:

- **LEC** (LAN Emulation Client) - An entity in an end system that performs data forwarding, address resolution, and other control functions. A LEC also provides a standard LAN service interface to any higher-layer entity that interfaces to the LEC. Each LEC is identified by a unique ATM address, and is associated with one or more Media Access Control (MAC) addresses reachable through that ATM address.

- **LECS** (LAN Emulation Configuration Server) - An entity that assigns individual LANE clients to particular Emulated LANs (ELANs) by directing them to the LAN Emulation Server (LES) that corresponds to the ELAN. There is logically one LECS per administrative domain, and this serves all ELANs within that domain.
- **LES** (LAN Emulation Server) - An entity that implements the control function for a particular ELAN. There is only one logical LES per ELAN, and it is identified by a unique AT address.
- **BUS** (Broadcast and Unknown Server) - Multicast server used in ELANs to flood traffic addressed to an unknown destination and to forward multicast and broadcast traffic to the appropriate clients.

The basic concepts are consistent between LANE V1 and LANE V2, however there are some differences between them. The main difference is that LANE V2 provides QoS support and multiplexing of Virtual Circuits (VCs).

LANE is one of the mechanism the ATM Uplink module uses to simulate a LAN over the ATM network. By implementing a LANE client in the ATM Uplink module, the ATM network can seamlessly provide connectionless LAN and multicast capabilities to the rest of the Cajun system.

The logical topology of the ATM Uplink module interfaces is quite different from the physical connections. LECs are configured on the ATM Uplink module. A LEC is not associated with a physical port, but instead is associated with a LANE server that forms an ELAN.

A LEC is treated similarly to an Ethernet port of the Cajun system and is associated with a Virtual LAN (VLAN). A LEC is represented and configured as a switch port in the Cajun system. Each VLAN may have only one LEC per ATM Uplink module, and each module may have only one LEC per ELAN.

RFC 1483

RFC 1483 defines an encapsulation method for transporting multiple protocols over the same or different VCs using the ATM Adaptation Layer 5 (AAL5) protocol. Implementation is limited to Permanent Virtual Circuits (PVCs). The ATM Uplink module supports 802.3 Ethernet, as well as a routed Protocol Data Unit (PDU) for layer 3.

The ATM Uplink module supports up to 128 Virtual Switch Ports (VSPs) and LECs per module. A VSP is a single port on the Cajun P550/P880 switch. It appears as a switch port to the supervisor module and is bound to a VLAN by the supervisor. Only one VSP may be bound to a particular VLAN.

*** Notes:**

- You need a license key in order to use RFC 1483. Refer to the *Cajun P550/P880 Switch ATM Uplink Installation Sheet* for more information on the license key.
- You can configure a module with both LANE and RFC 1483, if you have purchased a RFC 1483 license key

Quality of Service

QoS (Quality of Service) is a measure of guarantee performance for the transmission quality and service availability of a transmission system.

QoS is implemented in LANE through configuring sets of ATM traffic parameters (QoS Sets) and associating these with the different Ethernet frame priorities (0 - 7). A Data Direct Virtual Channel Connection (DDVCC) is setup to a QoS capable LEC for each QoS set as needed.

A QoS domain is a set of rules for mapping between frame priorities and ATM QoS Sets. A QoS Domain also consists of a series of QoS Sets and their priority mappings. A QoS Set is a set of signaling parameters that describe a traffic class.

In an RFC 1483 environment, each PVC has its own QoS parameters. Traffic priority to channel mapping is done through a link that groups up to eight channels to a common ATM end point.

UNI Signaling

User-to-Network Interface Signaling (UNI) dynamically creates and removes Switched Virtual Connections (SVCs) in an ATM network. The higher layer ATM protocols, specifically LANE, use the UNI signaling for connectivity.

ILMI 4.0

The Integrated Local Management Interface (ILMI) protocol provides the ATM Uplink module with status and configuration information across the user-to-network interface. This information includes ATM network prefixes, registered services, and capabilities.

PNNI

Private Network-to-Network Interface (PNNI) is a dynamic routing protocol that manages and allocates network resources for SVCs in an ATM network. Because the ATM Uplink module implements PNNI in non-transit mode, the ATM Uplink module does not act as an intermediate ATM switch in an ATM network. This provides high-performance edge access and load-sharing.

PNNI provides the ability to distribute topology information throughout the network. The ATM Uplink module is capable of having multiple active links, so PNNI is used to make routing selections to optimize link utilization and provide load sharing. When a connection with specific QoS parameters is requested, PNNI is able to dynamically find a possible path (if any) satisfying the request, allocate the necessary resources in the network, and provision the connection.

PNNI enables the network to respond quickly to link failures, link recoveries, and changing network loads on any link. The network is able to adapt to changes in the addressing of a network or the topology of the network as switches are added or deleted.

Link Failover

*** Note:** This feature applies to LANE only.

In networks that do not support PNNI, you can use link failover as an alternative to multiple active interfaces. With this feature, one link is active with all other links designated as standby. If one link loses its connectivity, a standby link becomes active and the connections are re-established. Links are weighted to determine which link attempts to take over first.

Spanning Tree

The SpanningTree protocol is used to prevent loops from forming in your network. The spanning tree algorithm creates a single path through the network by ensuring that if more than one path exists between two parts of a network, only one of these paths is used, while the others are blocked. Because of the number of "bridges" present in a switched networking environment, spanning tree structures can become extremely complex. The ATM Uplink module supports the spanning tree per VLAN option (each LEC has an independent STP state).

*** Note:** The current version of the ATM Uplink module supports only the spanning tree per VLAN option**.** Each VLAN runs a separate spanning tree with its own Bridge Protocol Data Units (BPDUs). This allows each LEC to have a spanning tree state that is independent of the other LECs on its module and does not support spanning tree on RFC 1483 connections.

For more information on spanning tree support and configuration, refer to the *Cajun P550R/P880/P882 Switch User Guide*.

Random Early Detection (RED)

Random Early Detection (RED) provides a congestion control mechanism for data over ATM. A transport protocol (for example, TCP) detects congestion only after a packet has been dropped. When RED is NOT configured, packets are dropped when the queue at the outgoing link becomes full. When this happens, multiple hosts simultaneously decrease their transmission windows, regardless of how much each host contributes to the congestion. This results in synchronized peaks in traffic from multiple hosts, causing inefficient link utilization.

RED monitors the average queue size and it statistically drops packets in congested conditions before the queue is full. Therefore, the hosts that generate more traffic during queue congestions mos likely have more packet loss than hosts generating less traffic.

Multiple ATM Uplink Modules

You can install more than one ATM Uplink module in your Cajun P550/P880 switch. Using multiple ATM Uplink modules provides the following advantages:

- **Failover**

  *** Note:** This is for LANE only.

  By statically assigning the LECs of the same ELAN on different ATM Uplink modules to the same VLAN, per-VLAN spanning tree provides failove . The forwarding port is the port with the lowest port ID.

  *** Note:**

  - Hunt Groups are not supported.
  - If you are not using per-VLAN spanning tree, make sure there are no loops in your configuration.

- **PNNI/UNI**

  You can configure both PNNI and UNI. However, you cannot configure both on the same module. PNNI and UNI must be configured on different modules and you can configure either on multiple modules.

- **More ATM Traffic**

  Each module can support up to 128 switch ports, therefore you can direct more ATM traffic through your Cajun P550/P880 switch.

  *** Note:** For PNNI, you canno load share between different modules, but you can load share between different ports on the same module.

2 Configuring the Caju ATM Uplink Module

Overview

This chapter provides configuration information relevant to both LANE and RFC 1483 configurations. For information on LANE specific configurations, refer to Chapter 3, “Configuring LANE”. For information on RFC 1483 specific configurations, refer to Chapter 4, “Configuring RFC 1483”.

The following sections are included in this chapter:

- Logging into the ATM Uplink Module Using the Web Agent
- Viewing Module Settings
- Modifying ATM Physical Ports
- Viewing ATM Uplink Module Statistics
- Configuring the Static LANE Address ForwardingTable (LAFT)
- Configuring RED Pack Parameters

Logging into the ATM Uplink Module Using the Web Agent

The Cajun P550/P880 switch includes an embedded HTTP server (Web Agent) that enables you to set all the switch’s parameters, including the ATM Uplink module. You can use the Web Agent for quick and simple configuration changes.

*** Note:** Refer to the *Cajun P550R/P880/P882 Switch User Guide* for more information about the Web Agent. Refer to the *Cajun P550/P880 Manager User Guide* for information on monitoring and configuring the Cajun switch using the Cajun P550 Manager interface.

Although the Web Agent supports most frame-capable browsers, the system has been qualified with the following browsers:

- Netscape Navigator 4.5 or later
- Microsoft Internet Explorer 3.0 or later

To log in to the switch Web Agent

1. Start your browser
2. Enter the **URL** of the switch you want to manage (for example: http://127.1.1.1) in the Location field.

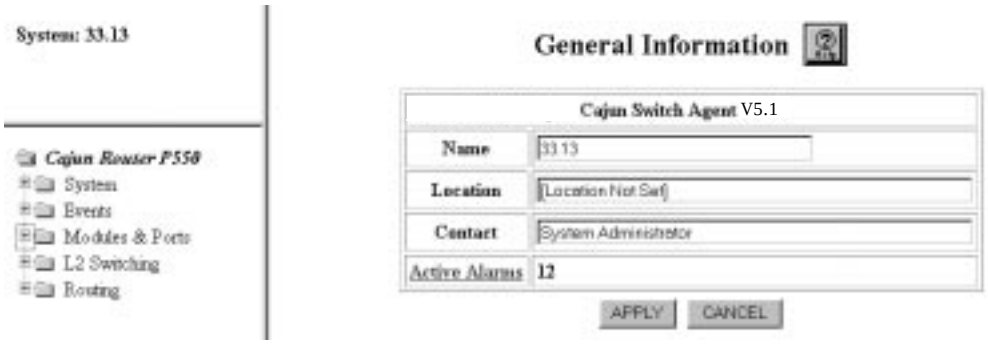
   *** Note:** Each interface to the supervisor module (out-of-band or inband) has a separate IP address. For layer 3, this location can be that of any of the router interfaces.

3. Click **Enter**. The login window opens.
4. Click **Login.** The Username/Password dialog box opens.
5. Enter a **valid user name**. The default super user name is **root**.
6. Enter a **valid password**. The default password is **root**. The General Information dialog box opens (Figur e2-1).

   *** Notes:**

   - Change the root password for the system as soon as possible to optimize security. Refer to the *Cajun P550R/P880/P882 Switch User Guide* for more information on changing your password.
   - Use the left column to select a group, such as System, to view the Web Agent dialog boxes.

Figure 2-1. General Information Dialog Box



Viewing Module Settings

The module setting configurations include:

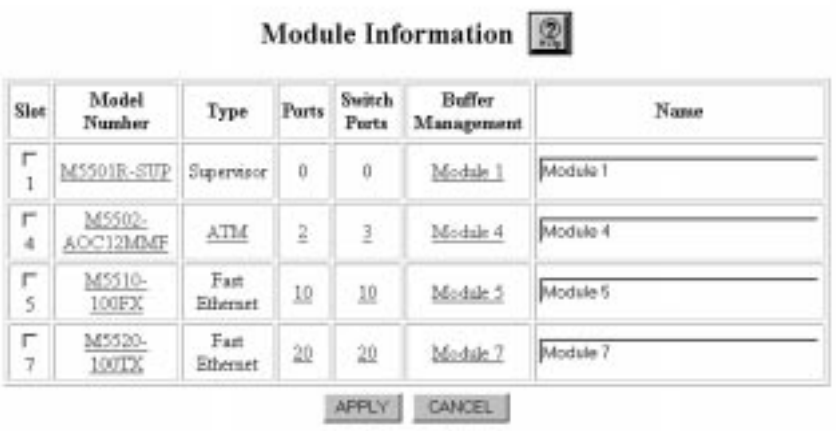
- Viewing ATM Uplink Module Details
- Viewing Module Information

Viewing ATM Uplink Module Details

After you install the ATM Uplink module, you may want to view the module information to ensure that the system recognizes the module. To view the ATM uplink module information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 2-2). If the system recognizes the ATM Uplink module, it appears in the list of available modules (ATM) in the Type column.

Figure 2-2. Module Information Dialog Box



2. Click the **Model Number** (for example, M5502-AOC12MMF, M5502-AOC12SMF, M5502-AOC3MMF, or M5502-AOC3SMF) of the ATM Uplink module you want to view in the Model Number column. The Module Details dialog box opens (Figur e2-3). Tabl e2-1 provides information on the Module Details parameters.

Figure 2-3. Module Details Dialog Box

.

Table 2-1. Module Details Paramete r

Parameter	Definition
Inventory Version	Displays the inventory version of the ATM Uplink module.
Serial Number	Displays the serial number of the ATM Uplink module.
Model Number	Displays the model number of the ATM Uplink module.
Model Type	Displays the model type of the ATM Uplink module.
Hardware Version	Displays the hardware version number of the ATM Uplink module.
Power Consumption	Displays the power consumption of the ATM Uplink module.
Manufacture Date	Displays the manufacture date of the ATM Uplink module.
Manufacture Name	Displays the name of the manufacturer of the ATM Uplink module.
Notes	Enter any notes about the ATM Uplink module.

3. **Optional**: Enter any notes in the **Notes** field.
4. Click **APPLY** to save your changes if you entered any notes, or **CANCEL** to restore the previous settings.

Viewing Module Information

To view ATM uplink module information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 2-2).
2. Click **ATM** in the Type column of the ATM Uplink module you want to view. The ATM Module Information dialog box opens (Figure 2-4). Table 2-2 describes the ATM Module Information dialog box parameters.

Figure 2-4. ATM Module Information Dialog Box

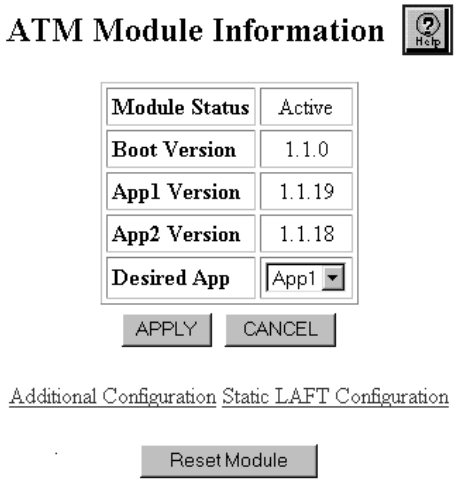


Table 2-2. ATM Module Information Parameter

Parameter	Definition
Module Status	Displays the ATM Uplink module status. Options include: • **Waiting Init** - Module is in set up mode. • **Initializing** - Module is sending packets to connected devices • **Running Diagnostics** - Module is running internal diagnostics. • **No Valid Image** - Image may be corrupted. Download a new image. • **Booting Image** - The module is booting up. • **Active** - The module is ready.
Boot Version	Displays the version of the boot image software.
APP1	Displays the image version on APP1.

Table 2-2. ATM Module Information Parameters

Parameter	Definition
APP2	Displays the image version on APP2.
Desired App	Select the application image on the module that you want to boot from. Options include: • App1 • App2 • Boot - Use only if App1 and App2 are corrupted. **Note:** Boot is not a fully functional image. Its purpose is to verify that the module is able to start and can enable a download.

3. Select the **APP** from the Desired App pull-down menu to use with the ATM Uplink module.

4. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

   Or

   Optional: Click **Reset Module** to reboot the module if you downloaded new code.

⚠ CAUTION

Before clicking Reset Module, make sure you copy the Running Config to the Startup Config. Otherwise, any changes you have made to the ATM Uplink module that are in the current Running Config will be lost.

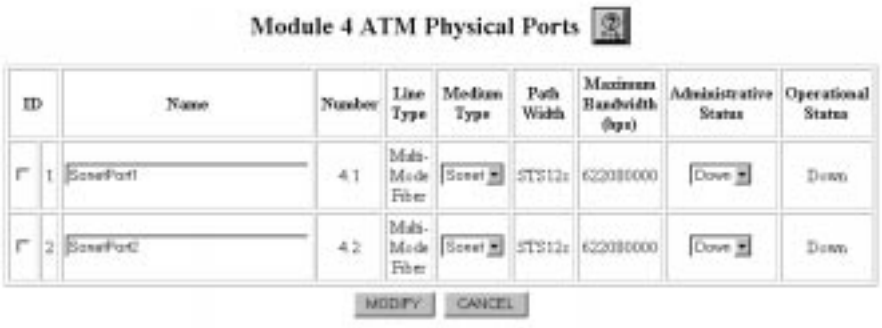
Modifying ATM Physical Ports

To modify ATM physical ports:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 2-2).

2. Click the **number** of the ATM Uplink module in the Ports column. The Module # ATM Physical Ports dialog box opens (Figure 2-5).

Figure 2-5. ATM Physical Ports Dialog Box



3. Select the port **ID** you want to modify.
4. Use Table 2-3 to modify your ATM physical ports:

Table 2-3. Module# ATM Physical Ports Dialog Box Par a m e t e r

Parameter	Definition
ID	Displays the ATM physical port ID number.
Name	Enter the ATM physical port name. The name can be up to 32 characters.
Number	Displays the ATM physical port number.
Line Type	Displays the line type. Types include: • Multi-Mode Fiber (MMF) • Single-Mode Fiber (SMF
Medium Type	Select the medium type from the pull-down menu. Types include: • **SONET** - USA • **SDH** - International **Note:** The port must be administratively (forced) down to modify this setting.
Path Width	Displays the path width of the physical port.
Maximum Bandwidth (bps)	Displays the maximum bandwidth.

Table 2-3. Module # ATM Physical Ports Dialog Box Parameters

Parameter	Definition
Administrative Status	Select the administrative status of the port from the pull-down menu. Options include: • **Up** - The ATM desired operational status. • **Down** - Forces port down.
Operational Status	Displays the operational status of the module. Options include: • **Up** - The physical port is operational. • **Down** - The physical port is non-operational.

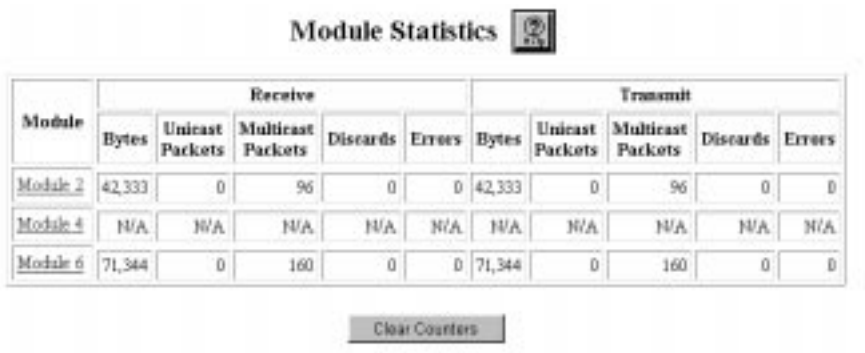
5. Click **MODIFY** to save your changes, or **CANCEL** to restore the previous settings.

Viewing ATM Uplink Module Statistics

To view ATM Uplink module statistics:

1. Select **Modules & Ports > Statistics** from the Web Agent. The Module Statistics dialog box opens (Figure 2-6).

Figure 2-6. Module Statistics



2. Select the **Module #** of the ATM Uplink module in the Module column. The Module Statistics dialog box for that module opens (Figur e2-7).

*** Notes:**

- To verify the ATM Uplink module number, select **Modules & Ports > Configuration**. The Module Information dialog box opens (Figure 2-2), listing the module numbers.
- Table 2-4 describes the Module Statistics parameters.

Figure 2-7. Module Statistics Dialog Box (Module #)

Table 2-4. Module Statistics Parameters

Parameter	Description
ATM cells in	Total ATM cells received on this port minus idle cells.
ATM cells on unopened VC	Total ATM cells received on this port for which no Virtual Channel Identifier (VCI was set-up.
ATM cells dropped for CRC10 error	Total ATM cells with a payload type supporting CRC10 (Cyclic Redundancy Check) that failed CRC10 validation.
AAL5 packets with CRC error	Total AAL5 frames that failed CRC32 traile validation.
AAL5 packets dropped for LEC echo	Total AAL5 frames received on this port that had a source LEC ID that matched the receiving LEC ID.
AAL5 packets dropped for no buffer available	Total AAL5 frames that could not be re assembled due to resource exhaustion.
AAL5 packets dropped for trailer error	Total AAL5 frames received on this port with an error in the AAL5 trailer.
AAL5 packets dropped for AAL5 Abort	Total AAL5 frames dropped because the sending station set the trailer size to zero.
AAL5 oversize packets dropped	Total AAL5 frames dropped because the frame length exceeded 11532 octets.
AAL5 packets dropped for De-encapsulation error	Total AAL5 frames dropped due to errors in the frame tag header (LLC (Logical Link Control) encapsulation header).
AAL5 packets dropped for re-assembly time out	Total of AAL5 frames dropped for timeout.
Ethernet packets sent to Switch Fabric	Total Ethernet frames received over ATM and forwarded to the switch.
Ethernet packets dropped for output Q full	Total Ethernet frames received over ATM but dropped for Queue overflow.
Ethernet packets dropped for no buffer	Total Ethernet frames received over ATM, but dropped for resource exhaustion.
AAL5 packets sent to Up-Link CPU	AAL5 frames received over ATM and directed to the uplink CPU.
AAL5 packets to Up-Link dropped for output Q full	AAL5 frames received over ATM intended for the uplink CPU but dropped for Queue overflow.

Parameter	Description
AAL5 packets to Up-Link dropped for no buffer	AAL5 frames received over ATM intended for the uplink CPU but dropped for resource exhaustion.
Ethernet packets received from Switch Fabric	Total Ethernet frames directed by the switch to the ATM network.
Ethernet packets from Switch Fabric sent to unopened VC	Total Ethernet frames directed by the switch to an unopened virtual circuit.
Ethernet packets from Switch fabric dropped for FCS error	Total Ethernet frames directed by the switch to the ATM network, but dropped for CRC error.
Ethernet packets from Switch Fabric dropped for RED	Total Ethernet frames directed by the switch to the ATM network but dropped by the RED algorithm.
Ethernet packets from Switch Fabric dropped for channel collision	Ethernet frames intended for the ATM network, but dropped due to collision with packet from the uplink CPU on the intended virtual circuit.
Ethernet packets from Switch Fabric dropped for no buffer	Ethernet frames intended for the ATM network, but dropped due to resource exhaustion.
Ethernet packets from Switch fabric dropped for hardware error	Ethernet frames intended for the ATM network, but dropped due to hardware error.
AAL5 packets sent from Up-Link CPU	AAL5 frames transmitted by the uplink CPU.
AAL5 packets from Up-Link CPU sent to unopened VC	AAL5 frames transmitted by the uplink CPU to an unopened virtual circuit.
AAL5 packets from Up-Link CPU dropped for FCS error	AAL5 frames transmitted by the uplink CPU, but dropped for CRC error.
AAL5 packets from Up-Link CPU dropped for RED	AAL5 frames transmitted by the uplink CPU, but dropped for RED algorithm.
AAL5 packets from Up-Link CPU dropped for channel collision	AAL5 frames transmitted by the uplink CPU, but dropped for channel collision.
AAL5 packets from Up-Link CPU dropped for no buffer	AAL5 frames transmitted by the uplink CPU, but dropped for resource exhaustion.

Parameter	Description
AAL5 packets from Up-Link CPU dropped for hardware error	AAL5 frames transmitted by the uplin CPU, but dropped for hardware error.
AAL5 oversize packets dropped	AAL5 frames dropped due to exceeding the link Maximum Transmission Unit) MTU.
ATM cells out	Total ATM cells transmitted on this port to the ATM network.

Configuring the Static LANE Address Forwarding Table (LAFT)

To configure the static LANE Address Forwarding Table (LAFT):

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 2-2).
2. Click **ATM** in the Type column of the ATM Uplink module you want to view. The ATM Module Information dialog box opens (Figure 2-4).
3. Click **Static LAFT Configuration**. The Static LAFT Address Configuration dialog box opens (Figure 2-8).

Figure 2-8. Static LAFT Address Configuration Dialog Box

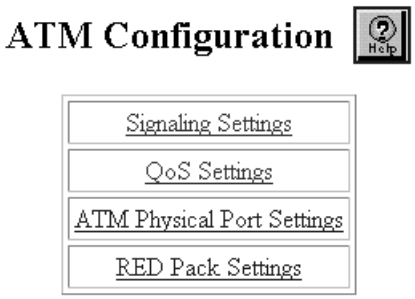
4. Enter the **MAC Address** of the remote segment of the VLAN.
5. Select the **appropriate VLAN** from the VLAN pull-down menu.
6. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Configuring RED Pack Parameters

To configure RED pack parameters:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 2-2).
2. Click **ATM** in the Type column of the ATM Uplink module you want to modify. The ATM Module Information dialog box opens (Figure 2-4).
3. Click Additional Configuration. The ATM Configuration dialog box opens (Figure 2-9).

Figure 2-9. ATM Configuration Dialog Box



4. Click **RED Pack Parameter** . The RED Pack Parameters dialog box opens (Figur e2-10). Tabl e2-5 describes the parameters.

*** Note:** There are four RED Pack settings available. Each default settings can be modified. Table 2-6 lists the factory default RED Pack parameter settings.

Figure 2-10. RED Pack Parameters

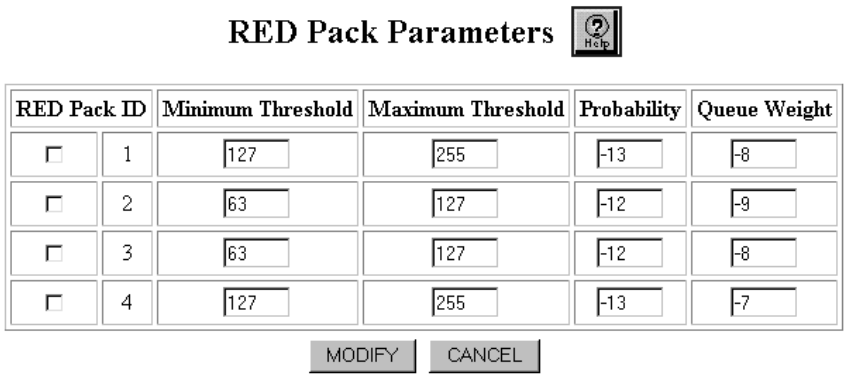


Table 2-5. RED Pack Parameters

Parameter	Description
RED Pack ID	Select the RED Pack ID you want to modify.
Minimum Threshold	Enter the Minimum Threshold. This parameters determines the minimum number of cells in the queue before starting to drop packets in a random basis. The Minimum Threshold must be lower than the Maximum Threshold The range is based on the Queue Weight: **Queue Weight** — **Minimum Threshold** -7, -8 — 1-255 -9 — 1-127 -10 — 1-63
Maximum Threshold	Enter the Maximum Threshold. This parameters determines the maximum number of cells allowed in the queue. If this number is surpassed, the incoming packets are dropped. The range is based on the Queue Weight: **Queue Weight** — **Maximum Threshold** -7, -8 — 1-255 -9 — 1-127 -10 — 1-63

Parameter	Description
Probability	Enter the Probability. This parameter determines the probability index for dropping packets on a random basis. The range is -15 to -4. The higher the number, the higher the probability cells will be dropped.
Queue Weight	Enter the Queue Weight. This parameter determines how quickly the ATM Uplink module responds to bursts of traffic. The range is -10 to -7. The lower the number the slower the response.

5. Click **MODIFY** to apply the changes, or **CANCEL** to restore the previous settings.

Table 2-6. Default RED Pack Parameter Setting

RED Pack ID	Minimum Threshold	Maximum Threshold	Probability	Queue Weight
1	1	17	-10	-9
2	2	18	-10	-8
3	4	20	-10	-7
4	8	24	-10	-9

3 Configuring LANE

Overview

This chapter explains how to configure LANE only. For general configuration information, refer to Chapter 2 , “Configuring the Cajun ATM Uplink Module”. For information on configuring RFC 1483, refer to Chapte r3, “Configuring RFC 1483”. For more information about LANE, refer to "LANE" in Chapte r1.

The following sections are included in this chapter:

- Configuring Signaling Settings
- Configuring QoS Settings
- Configuring ATM Switch Port Parameters
- Viewing PNNI Statistics

Configuring Signaling Settings

Configuring signaling settings includes:

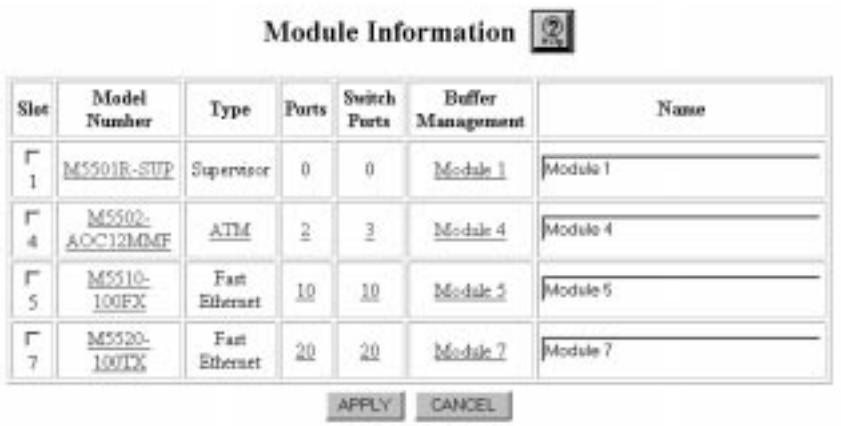
- Modifying Network Configuration
- Creating Virtual Ports
- Modifying Virtual Ports
- Deleting Virtual Ports

Modifying Network Configuration

To modify Network configuration parameters:

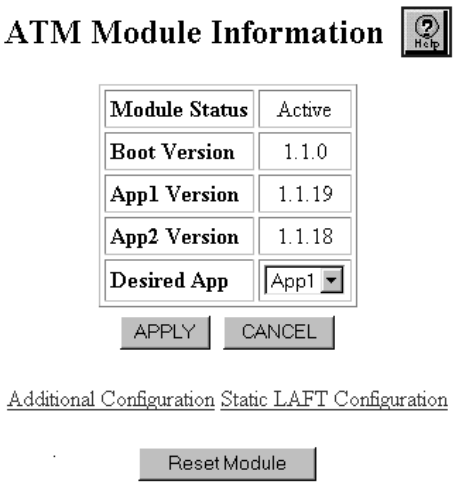
1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).

Figure 3-1. Module information Dialog Box



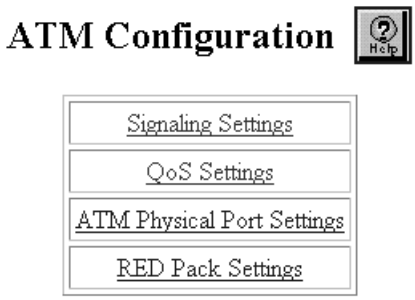
2. Click **ATM** in the Type column of the ATM Uplink module you want to modify. The ATM Module Information dialog box opens (Figure 3-2).

Figure 3-2. ATM Module Information Dialog Box



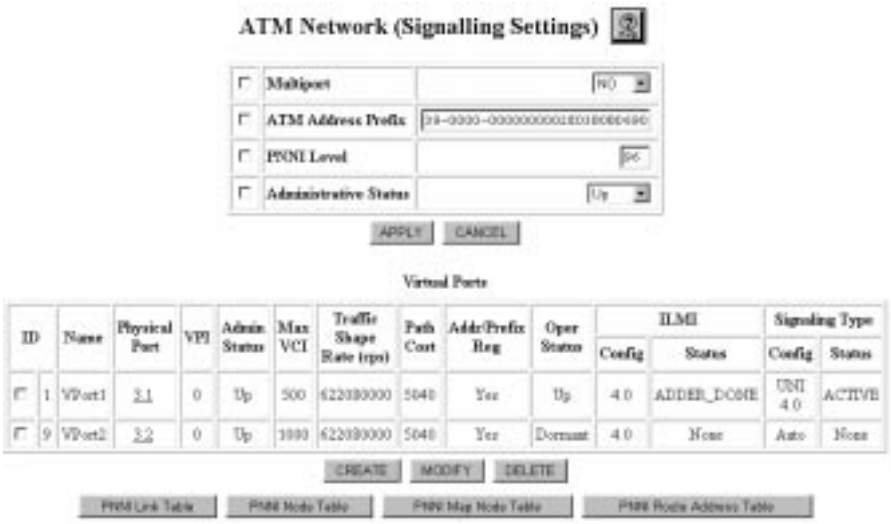
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figure 3-3).

Figure 3-3. ATM Configuration Dialog Box



4. Click **Signaling Settings**. The ATM Network (Signalling Settings) dialog box opens (Figu re3-4).

Figure 3-4. ATM Network (Signalling Settings) Dialog Box



5. Select the **Signalling Setting parameter** (Multiport, ATM Address Prefix, PNNI Level and/or Administrative Status) you want to modify.

*** Notes:**

- You can only change one parameter at a time.
- In order to change the virtual network parameters, the Administrative Status state must be **Down**. After changing the parameters, change the Administrative Status state to **Up** in order for the changes to take effect.

6. Use the information in Table 3-1 to modify your ATM network parameters.

Table 3-1. ATM Network Parameters

Parameter	Definition
Multiport	Select PNNI or Failover (UNI) mode. Options include: • **YES** - enables PNNI and load-sharing ports on the module and disables failover mode. • **NO** - disables PNNI and enables fail-over mode. Default is No.
ATM Address Prefix	Enter the server address associated with this port. It must match the PNNI peer group ID of the ATM switch.
PNNI Level	Enter the desired PNNI level. The lowest level is 0, the highest level is 104**,** in multiples of 8. The default is 96.
Administrative Status	Select the Administrative status of the port from the pull-down menu. Options include: • **Up** - Enables the ATM Uplink module. • **Down** - Disables the ATM Uplink module. Default is Up.

7. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

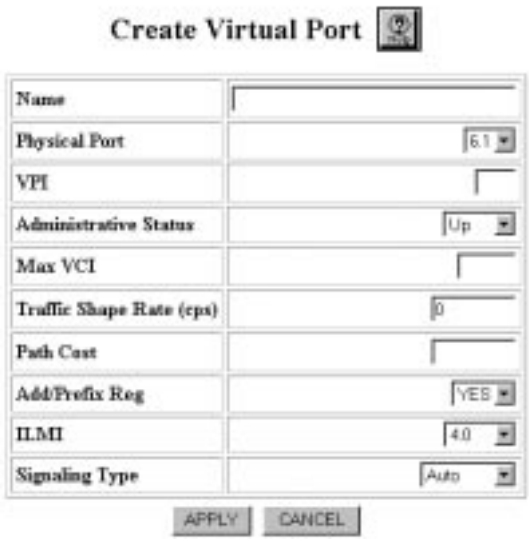
Creating Virtual Ports

To create virtual ports:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM Uplink module you want to create a virtual port for. The ATM Module Information dialog box opens (Figu re3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figur e3-3).
4. Click **Signaling Settings**. The ATM Network (Signalling Settings) dialog box opens (Fig ure3-4).
5. Click **CREATE**. The Create Virtual Port dialog box opens (Figure 3-5).

   *** Note:** You may have to scroll to see the **CREATE** button.

Figure 3-5. Create Virtual Port Dialog Box



6. Use the parameters described in Tabl e3-2 to create a virtual port.

7. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Table 3-2. Virtual Port Configuration Parameters

Parameter	Definition
Name	Enter a user-assigned name for this port, for example, a drop name or the name of the station or other device connected to the port.
Physical Port	Select the physical port that this virtual port resides on.
VPI	Enter the Virtual Path Identifier (VPI) for the virtual port. Valid ranges are 0 - 255.
Administrative Status	Select the administrative status of the port. Options include: • **Up** - The ATM desired operational status. • **Down** - Forces port down. Default is **Up**.
Max VCI	Enter the maximum number of VCIs (Virtual Channel Identifier) used by this port. The minimum number is 32; maximum number is 32767 across all virtual ports on a given physical port. This is based on the switch configuration. **Note:** If you create virtual ports, the total VCI cannot exceed 32767 for virtual ports combined on that physical port.
Traffic Shape Rate (cps)	Enter the maximum cell rate allowed on this virtual port. The range is 0-1412830 cps. The default rate is full length bandwidth. The traffic rate shape for all virtual ports combined cannot exceed the total traffic rate shape for that physical port. This is based on the type of module: • OC-3 - 353207 • OC-12 - 1412830

Table 3-2. Virtual Port Configuration Parameters

Parameter	Definition
Path Cost	Enter the PNNI link cost or Failover weight of this interface. The range is 0-16777215.
Add/Prefix Reg:	Select the address and/or prefi registration. Options include: • **Yes** - Enabled • **No** - Disabled **Note:** Address registration is required in the UNI mode only.
ILMI	Select ILMI address registration for this port. Options include: • 4.0 - Default • None
Signaling Type	Select which signaling service to use on this port. Options include: • Auto - Default • PNNI 1.0 • UNI 3. • UNI 3. • UNI 4. • None

Modifying Virtual Ports

To modify virtual ports:

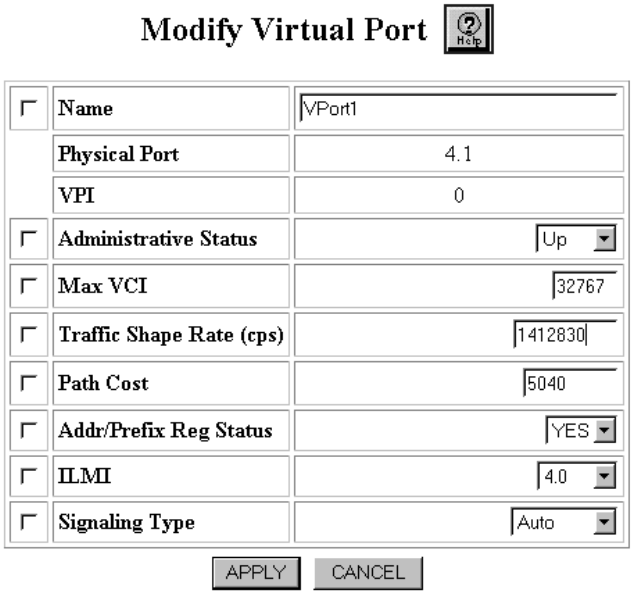
1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM Uplink module you want to modify. The ATM Module Information dialog box opens (Figure 3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figur e3-3).
4. Click **Signaling Settings**. The ATM Network (Signalling Settings) dialog box opens (Fig ure3-4).

5. Select the **ID** of the virtual port you want to modify in the ID column of the Virtual Ports table.

6. Click **Modify**. The Modify Virtual Port dialog box opens (Figure 3-6).

   *** Note:** In order to change the virtual port parameters, the Administrative Status state must be **Down**. After modifying the parameters, change the Administrative Status state to **Up** in order for the changes to take effect.

Figure 3-6. Modify Virtual Ports Dialog Box



7. Select the **parameters** you want to modify.

8. Use the information in Table 3-2 to modify your virtual port parameters.

   *** Note:** You can only view the Physical Port and VPI parameters from the Modify Virtual Port dialog box.

9. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Deleting Virtual Ports

To delete virtual ports:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM Uplink module you want to delete the virtual port from. The ATM Module Information dialog box opens (Figu re3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figur e3-3).
4. Click **Signaling Settings**. The ATM Network (Signalling Settings) dialog box opens (Fig ure3-4).
5. Select **the port** you want to delete in the ID column of the Virtual Ports table.

   *** Note:** In order to change the virtual port parameters, the Administrative Status state must be **Down**. After modifying the parameters, change the Administrative Status state to **Up** in order for the changes to take effect.

6. Click **Delete**. The Delete Virtual ATM Port dialog box opens.
7. Click **Yes** to remove the virtual port, or **No** to restore the previous setting.

Configuring QoS Settings

QoS (Quality of Service) is a measure of performance for a transmission system that reflects its transmission quality and service availability.

A QoS Domain consists of a series of QoS Sets, their priority mappings, and the set of LECs to which these rules apply. A QoS Set is a set of signaling parameters that describe a traffic class.

QoS parameters control the amount of traffic the source in an AT network sends over a Switched Virtual Circuit (SVC). If any switch along the path cannot accommodate the requested QoS parameters, the request is rejected, and a rejection message is forwarded back to the originator of the request.

If a requested QoS set is unavailable in an ATM network, a UBR (Unspecified Bit Rate) SVC is setup instead.

The QoS system configuration includes:

- Creating a QoS Domain
- Modifying QoS Domains
- Deleting QoS Domains
- Managing QoS Sets
- Modifying QoS Sets
- Modifying QoS Sets
- Creating a QoS Class Set
- Configuring ATM Switch Port Parameters

*** Note:** You must create domains before creating sets.

Creating a QoS Domain

To create a QoS domain:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM Uplink module you want to create a QoS domain for. The ATM Module Information dialog box opens (Figure 3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figure 3-3).
4. Click **QoS Settings**. The QoS Domains dialog box opens (Figure 3-7). Table 3-3 lists the parameters.

Figure 3-7. QOS Domains Dialog Box

Table 3-3. QoS Domains Parameters

Parameter	Definition
ID	Displays the QoS Domain ID number.
Name	Displays the QoS Domain name.
MUX ATM Address	Displays the ATM address used as the destination address of multiplexed Virtual Connections (VCs).
QoS Set	Click **Manage QoS Sets** to manage a QoS set for this domain. Refer to "Managing QoS Sets", later in this chapter for more information.

5. Click **Create**. The Create QoS Domain dialog box opens (Figure 3-8).

Figure 3-8. Create Qos Domain Dialog Box

6. Use the parameters described in Tabl e3-4 to create a QoS domain.

Table 3-4. QoS Domain Creation Parameters

Parameter	Definition
Name	Enter the name of the QoS domain you want to create. The default value is defaultDomain.
Mux ATM Address	Enter the ATM address used as the destinatio address of multiplexed Virtual Connections (VCs).

*** Notes:**

- UBR is set by default. Refer to “Creating a QoS Class Set” later in this chapter for information about changing a QoS Class.
- All LECs associated with the QoS domain must be administratively **down** to be modified. After creating the QoS domain, change the Administrative State to **Up** in order for the changes to take effect.
- Refer to "Modifying ATM Physical Ports" in Chapter 2, for more information.

7. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Modifying QoS Domains

To modify QoS domains:

*** Note:** All LECs associated with the QoS domain must be administratively **down** to be modified. After modifying the QoS domain, change the Administrative State to **Up** in order for the changes to take effect.

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).

2. Click **ATM** in the Type column of the ATM Uplink module you want to modify. The ATM Module Information dialog box opens (Figu r e3-2).

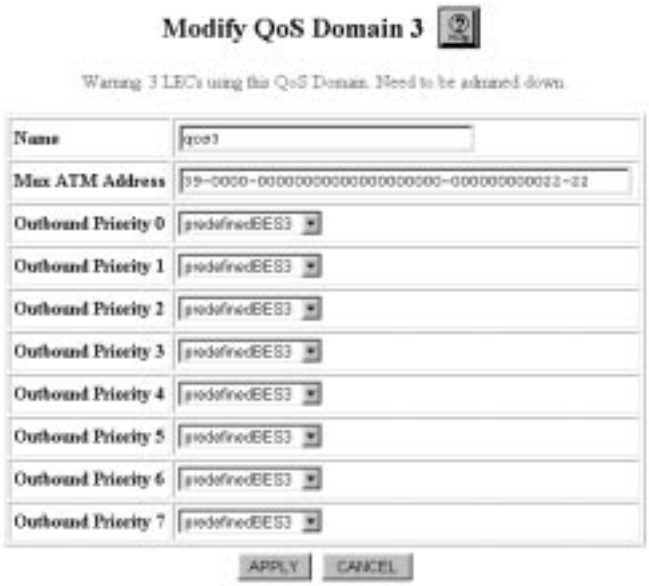
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figur e3-3).

4. Click **QoS Settings**. The QoS Domains dialog box opens (Figure 3-7).

5. Select the **QoS Domain** you want to modify in the ID column.

6. Click **Modify**. The Modify QoS Domain <#> dialog box opens (Figure 3-9).

Figure 3-9. Modify QOS Domain <#> Dialog Box



7. Use the information in Table 3-5 to set the QoS Set parameters.

8. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Table 3-5. Default QoS Set Parameter

Parameter	Definition
Name	Enter the new name of the QoS domain. The default value is **defaultDomain.**
Mux ATM Address	Enter the ATM address used as the destinatio address of multiplexed Virtual Connections (VCs).
Outbound Priority	Select a defined QoS set(s from the Outbound Priority pull-down menu(s).

Deleting QoS Domains

To delete QoS domains:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM Uplink module you want to delete the QoS domain from. The ATM Module Information dialog box opens (Figure 3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figure 3-3).
4. Click **QoS Settings**. The QoS Domains dialog box opens (Figure 3-7).
5. Select the **QoS domain** you want to delete.
6. Click **DELETE** to delete the QoS domain. The Delete QoS Domain dialog box opens.
7. Click **Yes** to remove the QoS Domain, or **No** to restore the previous setting.

Managing QoS Sets

To manage QoS sets:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM Uplink module you want to manage the QoS set on. The ATM Module Information dialog box opens (Figu re3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figur e3-3).
4. Click **QoS Settings**. The QoS Domains dialog box opens (Figure 3-7).
5. Click **Manage QoS Sets** for the QoS set you want to manage in the QoS Sets column. The QoS Sets for QoS Domain <#> dialog box opens (Figure 3-10). Table 3-6 describes the Manage QoS parameters.

Figure 3-10. QoS Set for QoS Domain <#> Dialog Box

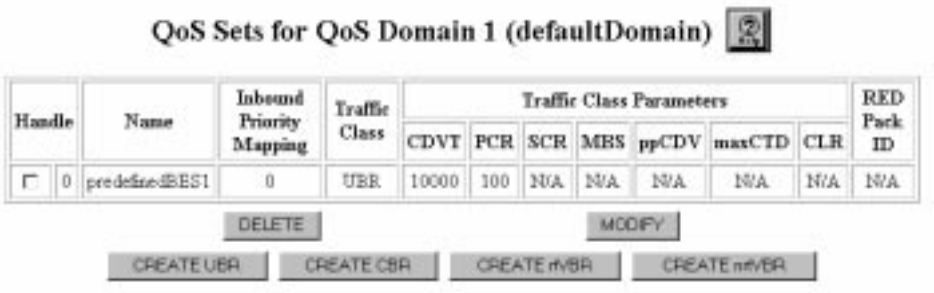


Table 3-6. Manage QoS Sets Dialog Box Parameters

Parameter	Definition
Handle	Displays the QoS set handle number. The handle acts as the internal reference number.
Name	Displays the QoS set name.
Inbound Priority Mapping	Displays the priority assigned to frames received on virtual circuits opened by this QoS set.
Traffic Class	Displays the service class. Classes include: • UBR • nrtVBR • rtVBR • CBR **Note:** Refer to “Creating a QoS Set”, later in this chapter, for more information about Service Class Parameters.
Traffic Class Parameters	Displays the service class parameters for each QoS set. Service class parameters include: • **CDVT** - Cell Delay Variation Tolerance • **PCR** - Peak Cell Rate • **SCR** - Sustained Cell Rate • **MBS** - Maximum Burst Size • **peak-to-peak CDV** - peak-to-peak Cell Delay Variation • **maxCTD** - Maximum Cell Transfer Delay • **CLR** - Cell Loss Ratio **Note:** For more information on the traffic class parameters, refer to Table 3-7.
RED Pack ID	Displays the RED pack ID. Refer to "Configuring RED Pack Parameters" in Chapter 2 for more information.

6. Complete **one** of the following:

   — Click **DELETE** to remove the selected QoS Set. The Delete QoS Set dialog box opens. Refer to "Deleting QoS Sets", later in this chapter.

   — Click **MODIFY** to modify the selected QoS Set. The Modify QoS Set dialog box opens (Figur e3-11). Refer to "Modifying QoS Sets", later in this chapter.

   — Click **CREATE UBR** to create a UBR QoS set. The QoS Set Creation dialog box opens (Fig ure3-12). Refer to "Creating a QoS Class Set", later in this chapter for more information.

   — Click **CREATE CBR** to create a CBR QoS set. The QoS Set Creation dialog box opens (Fig ure3-12). Refer to "Creating a QoS Class Set", later in this chapter for more information.

   — Click **CREATE rtVBR** to create a rtVBR QoS set. The QoS Set Creation dialog box opens (Figure 3-12). Refer to "Creating a QoS Class Set", later in this chapter for more information.

   — Click **CREATE nrtVBR** to create a nrtVBR QoS set. The QoS Set Creation dialog box opens (Figure 3-12). Refer to "Creating a QoS Class Set", later in this chapter for more information.

Deleting QoS Sets

To delete QoS sets:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).

2. Click **ATM** in the Type column of the ATM Uplink module you want to delete the QoS set from. The ATM Module Information dialog box opens (Figu re3-2).

3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figur e3-3).

4. Click **QoS Settings**. The QoS Domains dialog box opens (Figure 3-7).

5. Click **Manage QoS Set** in the QoS Sets column for the QoS set you want to manage. The QoS Sets for QoS Domain <#> dialog box opens. Tabl e3-6 describes the Manage QoS parameters.

6. Select the **QoS Set** you want to delete.

7. Click **DELETE** to delete the QoS set. The Delete QoS Set dialog box opens.

8. Click **Yes** to remove the QoS Set, or **No** to restore the previous setting.

*** Note:** A QoS Set that is linked to a LEC cannot be deleted.

Modifying QoS Sets

To modify QoS sets:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).

2. Click **ATM** in the Type column of the ATM Uplink module you want to modify the QoS set on. The ATM Module Information dialog box opens (Figure 3-2).

3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figure 3-3).

4. Click **QoS Settings**. The QoS Domains dialog box opens (Figure 3-7).

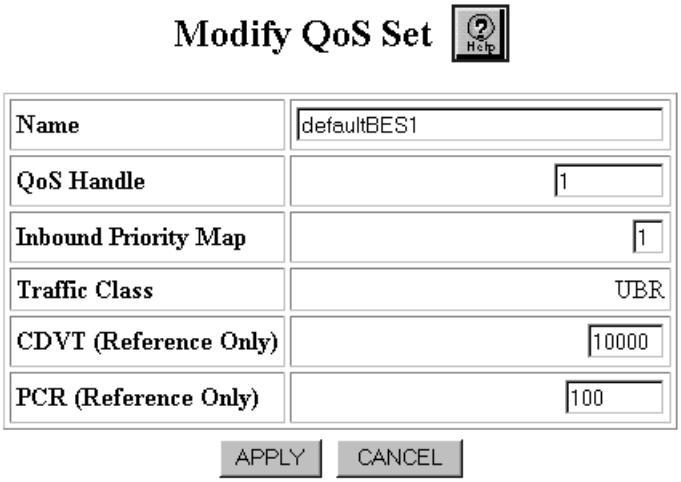
5. Click **Manage QoS Set** in the QoS Sets column for the QoS set you want to manage. The QoS Sets for QoS Domain <#> dialog box opens. Table 3-6 describes the Manage QoS parameters.

6. Select the **QoS Set** you want to modify.

7. Click **Modify**. The Modify QoS Sets dialog box opens (Figure 3-11).

*** Note:** Traffic class shown is UBR. This screen may vary, depending on the traffic class.

Figure 3-11. Modify QoS Set Dialog Box



8. Use the parameters described in Table 3-7 to modify your QoS set.

9. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Table 3-7. QoS Set Creation Parameter

Parameter	Definition
Name	Enter a user-assigned name for the set being created. The default is predefinedBES1.
QoS Handl	Enter the handle to the QoS Set. The handle acts as an internal reference number. Each QoS set should have a unique QoS handle.
Inbound Priority Map	Enter the mapping to be used on the inbound side, that uses the QoS parameters for setting up a data direct. Traffic on these priorities sets up a data direct using the QoS Set, if the threshold is reached.

Table 3-7. QoS Set Creation Parameters

Parameter	Definition
Traffic Class	Displays the traffic class for the set you are creating. Values include: • **UBR** - Unspecified bit rate which is characterized in terms of Cell Delay Variation Tolerance (CDVT), and Peak Cell Rate (PCR). • **CBR** - Constant bit rate. This is used by connections that request a static amount of bandwidth that is continuously available during the connection lifetime. This amount of bandwidth is characterized in terms of PCR, maxCTD, peak-to-peak CDV, CLR, and Cell Delay Variation Tolerance (CDVT). • **rtVBR** - Real-time variable bit rate. This is intended for real-time applications (voice and video). rtVBR connections are characterized in terms of PCR, SCR, Maximum Cell Transfer Delay (maxCTD), peak-to-peak Cell Delay Variation (CDV), CLR, and MBS. • **nrtVBR** - Non-real-time variable bit rate. This is intended for non-real-time application that have bursty traffic characteristics and which are characterized in terms of PCR, Sustainable Cell Rate (SCR), Cell Loss Ratio (CLR) and Maximum Burst Size (MBS). **Note:** Refer to “Creating a QoS Class Set” for more information.
CDVT	Enter the Cell Delay Variation Tolerance. When cells from two or more connection are multiplexed, cells of a given connection may be delayed. Simultaneously, cells of another connection are being inserted at the output of the multiplexer. Some randomness may affect the inter-arrival time between consecutive cells of a connection. The upper boundary on this delay is the CDVT.
PCR	Enter the Peak Cell Rate. This is a traffic parameter specifying an upper bound on the rate at which traffic can be submitted on an ATM connection. The unit of measurement is cells/second. The valid range is 2 to line rate.

Table 3-7. QoS Set Creation Parameter

Parameter	Definition
SCR	Enter the Sustainable Cell Rate. This is traffic parameter specifying an upper bound on the average rate of the conforming cells of an ATM connection. The unit of measurement is cells/second. The minimum value is 2 and it must be less than PCR. **Note:** This is not available for UBR or CBR.
MBS	Enter the Maximum Burst Size. This is the maximum number of cells allowed to arrive on a connection in excess of the PCR which is permitted without being dropped. The valid range is 1 to 1,000. The default is 100. **Note:** This is not available for UBR or CBR.
peak-to-peak CDV	Enter the Peak-to-Peak Cell Delay Variation. The valid range is dependent on the ATM switch configuration. **Note:** This is not available for UBR or nrtVBR.
max CTD	Enter the maximum Cell Transfer Delay. T is is the maximum delay beyond which the cells will either be delivered late or lost. The valid range is 0 to -1. **Note:** This is not available for UBR or nrtVBR.
CLR	Enter the Cell Loss Ratio. The CLR for cells sent that do not conform to a traffic contract (or a UBR connection) that is not guaranteed. The vali range is 0 and 1. **Note:** This is not available for UBR.
RED Pack ID	Enter the RED Pack ID. Valid range is 1-4. Refer to "Configuring RED Pack Parameters" in Chapter 2 for more information on RED Pack parameters. *** Note:** This is not available for UBR.

Creating a QoS Class Set

There are four different QoS class sets:

- **UBR** (Unspecified Bit Rate) - Allows any amount of data up to a specified maximum to be sent across the network, but there are no guarantees in terms of delivery, file transfer, Ethernet connectivity, cell loss rate, or delay.
- **CBR** (Constant Bit Rate) - Is used for connections that depend on precise clocking to ensure undistorted delivery. I is recommended that constant bandwidth is always reserved.
- **rtVBR** (real time Variable Bit Rate) - Is used for connections in which there is a fixed timing relationship between samples. This is a service category intended for time dependent, real-time applications (voice and video) with variable bandwidth.
- **nrtVBR** (non-real Time Variable Bit Rate) - Is used for connections in which there is no fixed timing relationship between samples, but that still need a guaranteed QoS. This service category is intended for non-real-time applications with variable traffic, guaranteed delivery, but not dependen on time.

To create a QoS class set:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM Uplink module you want to create the QoS class set for. The ATM Module Information dialog box opens (Figure 3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figure 3-3).
4. Click **QoS Settings**. The QoS Domains dialog box opens (Figure 3-7).
5. Click **Manage QoS Sets** in the QoS Column for the QoS set you want to manage. The QoS Sets for QoS Domain <#> dialog box opens (Figure 3-10).

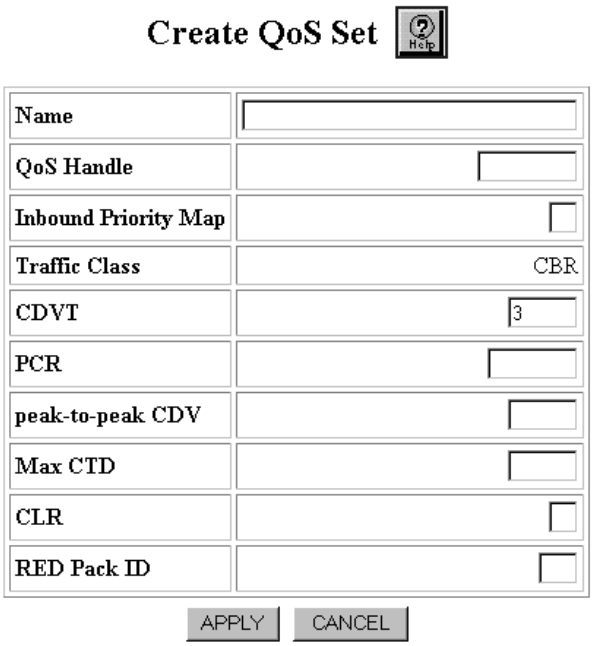
6. Click **one** of the following:

   - Create UBR
   - Create CBR
   - Create rtVBR
   - Create nrtVBR

   The Create QoS Set dialog box opens (Fig ure3-12).

   *** Note:** The Create QoS Set dialog box may vary slightly, depending on the QoS class set you chose to create. In Figur e3-12, CBR is selected.

Figure 3-12. Create QoS Set Dialog Box



7. Use the parameters described in Tabl e3-7 to create your QoS class set.

8. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Configuring ATM Switch Port Parameters

Switch port parameters set how each port performs switching functions.

This section includes:

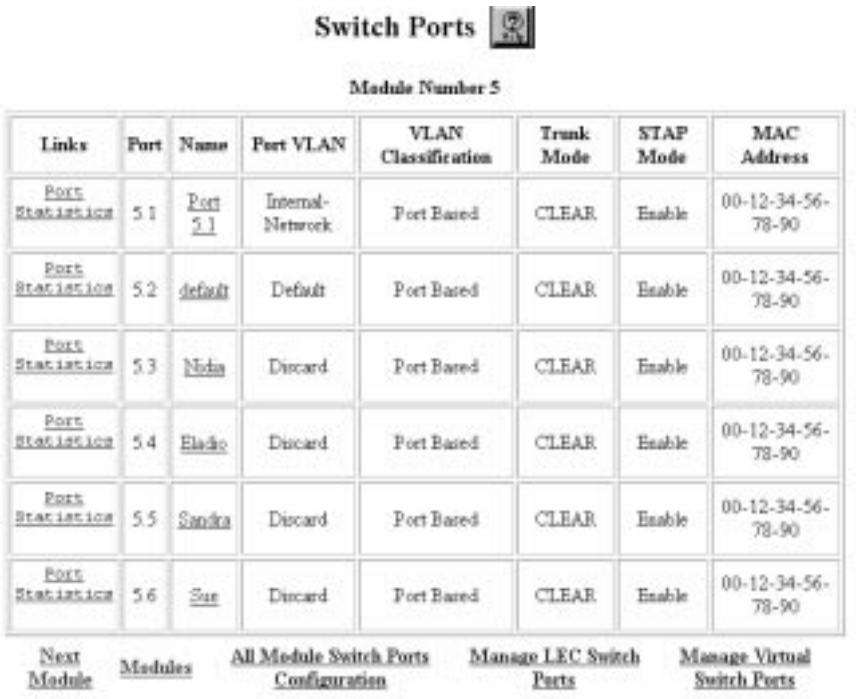
- Creating ATM LEC Switch Ports
- Modifying ATM LEC Switch Ports
- Deleting ATM LEC Switch Ports
- Configuring LEC Switch Port Parameters
- Configuring All LEC Switch Ports on an ATM Module

Creating ATM LEC Switch Ports

To create an ATM LEC switch port:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to create the LEC switch port for. The Switch Ports dialog box opens (Figur e3-13).

Figure 3-13. Switch Ports Dialog Box



Switch Ports

Module Number 5

Links	Port	Name	Port VLAN	VLAN Classification	Trunk Mode	STAP Mode	MAC Address
Port Statistics	5.1	Port 5.1	Internal-Network	Port Based	CLEAR	Enable	00-12-34-56-78-90
Port Statistics	5.2	default	Default	Port Based	CLEAR	Enable	00-12-34-56-78-90
Port Statistics	5.3	Nicki	Discard	Port Based	CLEAR	Enable	00-12-34-56-78-90
Port Statistics	5.4	Eladio	Discard	Port Based	CLEAR	Enable	00-12-34-56-78-90
Port Statistics	5.5	Sandra	Discard	Port Based	CLEAR	Enable	00-12-34-56-78-90
Port Statistics	5.6	Sue	Discard	Port Based	CLEAR	Enable	00-12-34-56-78-90

Next Module | Modules | All Module Switch Ports Configuration | Manage LEC Switch Ports | Manage Virtual Switch Ports

3. Click **Manage LEC Switch Port** . The ATM LEC Switch Ports dialog box opens (Figu re3-14).

Figure 3-14. ATM LEC Switch Ports Dialog Box

ATM LEC Switch Ports

Module 7

	ID	Name	Selector	Qos Domain	Config Version	Oper Status	Admin Status	Join Method	Max BUS Cellrate
☐	1	default	00	defaultDomain	V2	Down	Disabled	LECS	Unlimited
☐	2	doc	02	defaultDomain	V2	Operational	Enabled	LECS	Unlimited
☐	3	doppy	03	defaultDomain	V2	No VLAN	Disabled	LECS	Unlimited
☐	9	elan1	05	defaultDomain	V2	No VLAN	Disabled	LECS	Unlimited
☐	10	happy	06	defaultDomain	V2	No VLAN	Disabled	LECS	Unlimited
☐	11	grumpy	08	defaultDomain	V2	No VLAN	Disabled	LECS	Unlimited
☐	12	sleepy	09	defaultDomain	V2	No VLAN	Disabled	LECS	Unlimited
☐	13	bashful	10	defaultDomain	V2	No VLAN	Disabled	LECS	Unlimited
☐	14	sneazy	12	defaultDomain	V2	No VLAN	Enabled	LECS	Unlimited

CREATE | MODIFY | DELETE

4. Click **Create**. The Create LEC Switch Port creation dialog box opens (Figure 3-15).

Figure 3-15. Create LEC Switch Port Dialog Box

5. Use the information in Table 3-8 to create the ATM switch port parameters.

Table 3-8. ATM Switch Port Configuration Parameters

Parameter	Definition
Name	Enter the name of the ELAN for this LANE client. Note that the name is case-sensitive.
Version	Select the version of LANE to use. Options include: • V1 • V2 - Default
Administrative Status	Select the Administrative status. Options include: • Enabled • Disabled
QoS Domain	Select the QoS domain associated with this port. The default value is defaultDomain.

Parameter	Definition
Join Method	Select the join mode used by this port. Values include: • LECS - Default - Select when ELANs are controlled by a LECS. • LES - Select if you know the ATM address of the LES server that serves your ELAN.
Server ATM Address	Enter the server address associated with this port. The default ATM server LECS address i the well-known address: C50079000000000000000000-00A03E000001-00 (hex). *** Note:** The server ATM address is based on the join-method.
Client Selector	Enter the client selector. The valid range is 0 - FF (hex). You must use a unique value for each client.

6. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Modifying ATM LEC Switch Ports

To modify an ATM LEC switch port:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to modify the switch ports for. The Switch Ports dialog box opens (Figure 3-13).
3. Click **Manage LEC Switch Port** . The ATM LEC Switch Ports dialog box opens (Figu re3-14).
4. Select of the ATM LEC switch port you want to modify in the ID column.

*** Note:** In order to change the virtual port parameters, the Administrative Status state must be **Down**. After modifying the parameters, change the Administrative Status state to **Up** in order for the changes to take effect.

5. Click **Modify**. The Modify LEC Switch Port dialog box opens (Figure 3-16).

Figure 3-16. Modify LEC Switch Port Dialog Box

6. Use the parameters described in Tabl e3-9 to modify the LEC Switch Ports.

Table 3-9. LEC Switch Port Parameters

Parameter	Definition
Name	Enter the name of the ELAN for this LAN client. Note that the name is case-sensitive.
Version	Select the version of LANE to use. Option include: • V1 • V2 - Default
Administrative Status	Select the Administrative Status of the port from the pull-down menu. Options include: • **Enabled** • **Disabled**

Table 3-9. LEC Switch Port Parameters

Parameter	Definition
QoS Domain	Select the QoS Domain associated with this port. The default value is defaultDomain.
Join Method	Select the Join Method used by this port. Values include: • LECS - Default • LES
Server ATM Address	Enter the Server ATM Address associated with this LECS port. The server ATM server address is the well-known ATM Forum address: C5007900000000000000000000-00A03E000001-00 (hex) *** Note:** The server ATM address is based on the join-method.
Client Selector	Enter the Client Selector. The valid range is 0 - FF (hex). You must use a unique value for each client.
Max Unknown Frame Count	Enter the Maximum number of Unknown Frames sent to the BUS. Range is 2-31. The Default is 10. It must be greater than the LE ARP (Address Resolution Protocol) Trigger Count.
Max Unknown Frame Tim	Enter the maximum time frame over which the Max Unknown Frame Count applies. The Default is 1 second.
LE ARP Trigger Count	Enter the number of frames that should be sent via the BUS before trying to set up a direct connection. Range is 1-30. Must be less than the Max Unknown Frame Count.
Max BUS Rate	By default, ATM does not rate limit the BU connections. To rate limit the BUS connections, enter the Max BUS rate. This is based on the LANE server's capabilities.
Agetime	This parameter is not implemented in this feature.

7. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

Deleting ATM LEC Switch Ports

To delete an ATM LEC switch port:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to delete LEC switch ports from. The Switch Ports dialog box opens (Figur e3-13).
3. Click **Manage LEC Switch Ports**. The ATM Switch LEC Ports dialog box opens (Figure 3-14).
4. Select the **ATM LEC Port** in the ID column you want to delete.

   *** Note:** In order to change the virtual port parameters, the Administrative Status state must be **Down**.

5. Click **Delete**. The Delete ATM LEC Switch Ports dialog box opens.
6. Click **Yes** to delete the ATM port, or **No** to retain the port.

Viewing LEC Port Operational Information

To view the LEC port operational information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to view information for. The Switch Ports dialog box opens (Figure 3-13).
3. Click **Manage LEC Switch Ports**. The ATM LEC Switch Ports dialog box opens (Figure 3-14).
4. Click the **name** of the port in the Name column you want to view. The LEC Port <#> Operational Information dialog box opens (Figure 3-17). Table 3-10 describes the parameters.

   *** Note:** The LEC must be enabled and operational in order to view the information.

Figure 3-17. LEC Switch Port <#> Operational Information Dialog Box

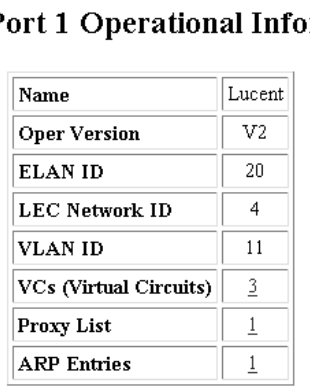


Table 3-10. LEC Port Operational Information Parameter

Parameter	Description
Name	Displays the name assigned to the LEC port.
Oper Version	Displays the operating version - where it is joined rather than configured.
ELAN ID	Displays the ID assigned by the LANE server.
LEC Network ID	Displays the ID assigned to the LEC by the LANE server.
VLAN ID	Displays the Cajun VLAN ID.
VCs (Virtual Circuits)	Displays the virtual circuit associated with this LEC.
Proxy List	Displays the list of MAC addresses that this LEC ARPs for.
ARP Entries	Displays the ARP responses received by the LEC.

Viewing VC Counters

The VC counters indicate whether or not traffic is passing through the network and at what rate. To view the VC counter information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to view VC counters for. The Switch Ports dialog box opens (Figur e3-13).
3. Click **Manage LEC Switch Port** . The ATM LEC Switch Port dialog box opens (Figure 3-14).
4. Select the **name of the port** in the Name column you want to view. The LEC Port <#> Operational Information dialog box opens (Figu r e3-17).
5. Click the **number** next to VCs (Virtual Circuits). The VC Table dialog box opens (Figu re3-18). Tab le3-11 describes the parameters.

Figure 3-18. VC Table Dialog Box

VC Table for LEC Switch Port 3 / VLAN 102

Link	Channel ID	VPI	VCI	Physical Port	Type
Statistics	186	0	58	4.1	Multicast Fwd
Statistics	200	0	72	4.1	Multicast Rcv
Statistics	211	0	83	4.1	Data Direct

Table 3-11. VC Table Parameters

Parameter	Description
Link	The link to a channel's counters.
Channel ID	Displays the internal channel handle.
VPI	Displays the virtual path identifier.
VCI	Displays the virtual circuit identifier.
Physical Port	Displays the physical port number.

Parameter	Description
Type	Displays the type of VC: • Multicast forward • Multicast receive • Data direct

6. Click **Statistics** in the Link column of the VC you want to view. The VC Counters dialog box opens (Fig ure3-19). Table 3-12 describes the parameters.

Figure 3-19. VC Counters Dialog Box

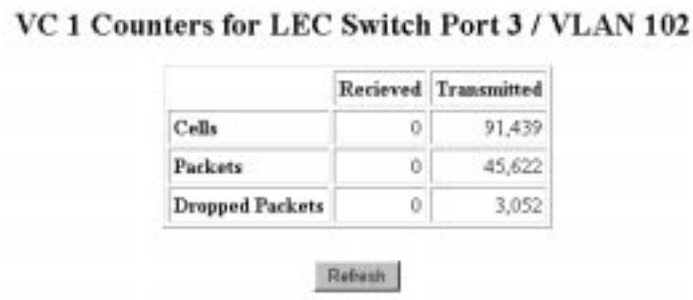


Table 3-12. VC Counters Parameters

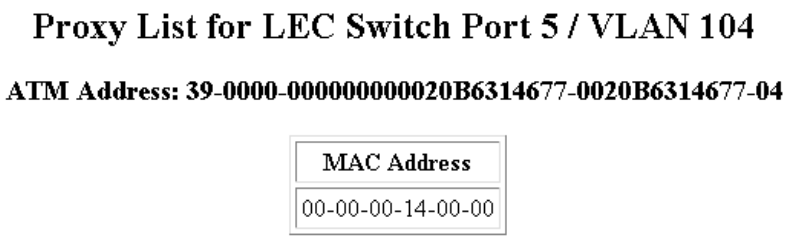
Parameter	Description
Cells	Displays the number of ATM cells received and/or transmitted.
Packets	Displays the number of Ethernetpackets received and/or transmitted.
Dropped Packets	Displays the number of Ethernet packets dropped.

Viewing the Proxy List

The Proxy List (list of Ethernet MAC addresses) allows you to view a LEC on the Ethernet side using a MAC address. To view the Proxy List:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to view the proxy list for. The Switch Ports dialog box opens (Figur e3-13).
3. Click **Manage LEC Switch Port** . The ATM LEC Switch Port dialog box opens (Figure 3-14).
4. Click the **name** of the port you want to view in the Name column. The LEC Port <#> Operational Information dialog box opens (Figu r e3-17).
5. Click the **number** next to the Proxy List. The Proxy List for LEC Switch Port <#> VLAN <#> dialog box opens (Figure 3-20):

Figure 3-20. Proxy List for LEC Switch Port <#>/VLAN <#> Dialog Box



Viewing the Priority Mapping Table

The priority mapping table allows you to view outbound priority mapping. To view the priority mapping table:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to view the priority mapping table for. The Switch Ports dialog box opens (Figur e3-13).
3. Click **Manage LEC Switch Ports**. The ATM LEC Switch Por dialog box opens (Figur e3-14).
4. Click the **name** of the port you want to view in the Name column. The LEC Port <#> Operational Information dialog box opens (Figure 3-17).
5. Click the **number** next to the ARP Entries. The ARP Table dialog box opens (Figur e3-21). Tabl e3-13 describes the parameters.

Figure 3-21. ARP Table Dialog Box

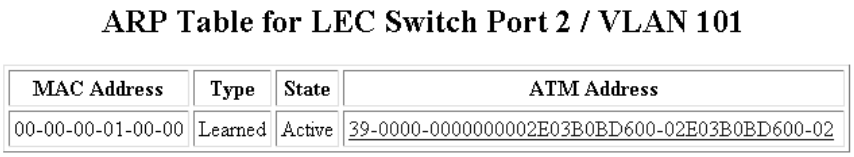


Table 3-13. ARP Table Parameters

Parameter	Description
MAC Address	Displays the MAC address of the destination address on the other side of the ATM cloud.
Type	Displays the type of ARP entry: • Learned - final state • Resolving - intermediary state

Parameter	Description
State	Options are: • Active • Inactive
ATM Address	The link to priority map table.

6. Click the **ATM Address** for the entry you want to view. The Priority Mapping for LEC Switch Port <#>/ VLAN <#> dialog box opens (Figu r e3-22).Tabl e3-14 describes the parameters.

*** Note:** Click **Statistics** to view the VC Counters. Refer to "Viewing VC Counters", earlier in this chapter for more information.

Figure 3-22. Priority Mapping for LEC Switch Port <#>/VLAN <#> Dialog Box

Priority Mapping for LEC Switch Port 2 / VLAN 101

ATM Address 39-0000-0000000002E03B0BD600-02E03B0BD600-02

Priority	Borrowed Bit	VPI	VCI	Channel ID	Link
0	Clear	0	82	210	Statistics
1	Set	0	82	210	Statistics
2	Set	0	82	210	Statistics
3	Set	0	82	210	Statistics
4	Clear	0	82	210	Statistics
5	Set	0	82	210	Statistics
6	Set	0	82	210	Statistics
7	Set	0	82	210	Statistics

Table 3-14. Priority Mapping Parameters

Parameter	Description
Priority	Displays priority information. Frames with particular priority tags destined for an ATM address, are transmitted on VPI/VCI in this table.
Borrowed Bit	Displays the status of the borrowed bit. If the bit is set, frames with that tag are forwarded on the channel associated with the table entry. If the bit is clear, frames with that priority are forwarded but rate-limited according to the maximum unknown frame count field configured for the LEC. Options are: • Clear • Set
Channel ID	Displays the Channel ID, which is the handle of the internal channel.
VPI	Displays the virtual path indicator.
VCI	Displays the virtual circuit indicator.
Link	The link to a channel's counters.

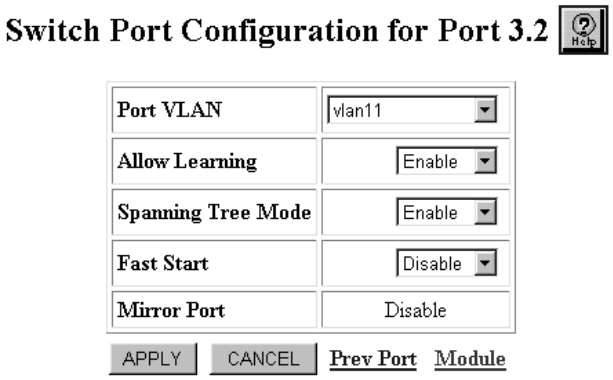
Configuring LEC Switch Port Parameters

To configure LEC switch port parameters:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to configure LEC switch ports on. The Switch Ports dialog box opens (Figure 3-13).
3. Click the **name** in the Port VLAN column for the port you want to configure. The Switch Port Configuration dialog box opens (Figu re3-23).

*** Note:** The Switch Port Configuration dialog box may appear slightly different than the one in the following figure, depending on the configuration of the port selected.

Figure 3-23. Switch Port Configuration Dialog Box



4. Use the parameters described in Tabl e3-15 to configure your switch port.

Table 3-15. Switch Port Configuration Parameter

Parameter	Definition
Port VLAN	Select the VLAN assignment for this switch port. The default value is Discard (no VLAN). **Note:** Only one LEC per VLAN is permitted.
Allow Learning	Select Enable or Disable the port's learning of new addresses. The default value Enable.
Spanning Tree Mode	Select Enable or Disable spanning tree protocol on this port. The default value is Enable.
Fast Start	Select Enable or Disable fast start on this port. The default value is Disable.
Mirror Port	Allows you to select a second port for diagnostic monitoring. **Note:** This is not available for the ATM Uplink module.

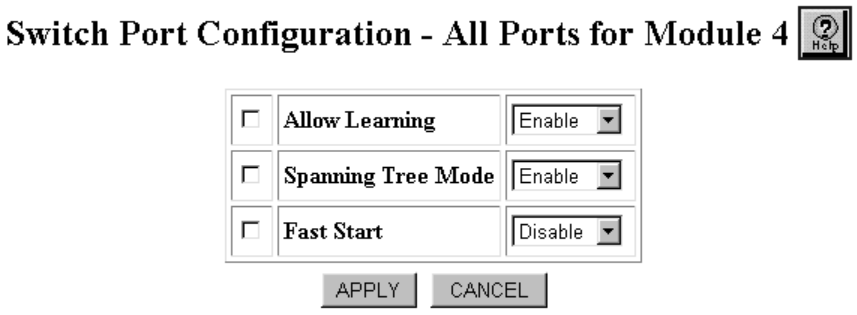
5. Complete **one** of the following:
   - Click **APPLY** to save your changes.
   - Click **CANCEL** to restore the previous settings.
   - Click **Previous Port** to display the previous switch port.
   - Click **Next Port** to display the next switch port.
   - Click **Module** to open the Switch Ports dialog box (Figure 3-13).

Configuring All LEC Switch Ports on an ATM Module

To configure all switch ports on a module:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click the **number** in the Switch Ports column for the ATM Uplink module you want to configure all LEC switch ports for. The Switch Ports dialog box opens (Figur e3-13).
3. Click **All Module Switch Ports Configuration**. The Switch Port Configuration - All Ports For Module <#> dialog box opens (Figu re3-24).

Figure 3-24. Switch Port Configuration - All Ports for Module <#> Dialog Box



4. Use the information in Table 3-15 to configure the parameters for all the switch ports on the module.

5. Click **APPLY** to save your changes, or **CANCEL** to restore the previous settings.

*** Note:** If you save your changes, the changes only apply to the current configured LEC switch ports on the ATM Uplink module.

Viewing PNNI Statistics

The Private Network-to-Network Interface (PNNI) is used in call se ups in ATM networks. PNNI is used in the switch for routing between the two Cajun interfaces and is useful in trouble shooting.

Viewing the PNNI statistics includes:

- Viewing PNNI Link Information
- Viewing PNNI Node Information
- Viewing PNNI Map Node Information
- Viewing PNNI Route Address Information

Viewing PNNI Link Information

To view PNNI link state information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).

2. Click **ATM** in the Type column of the ATM Uplink module you want to view PNNI link information for. The ATM Module Information dialog box opens (Figu re3-2).

3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figure 3-3).

4. Click **Signaling Settings**. The ATM Network (Signalling Settings) dialog box opens (Figu re3-4).

5. Click **PNNI Link Table.** The PNNI Link Table dialog box opens (Figu re3-25). Tab le3-16 provides information on the PNNI Link Info parameters.

*** Note:** You may have to scroll to see the PNNI option buttons.

Figure 3-25. PNNI Link Table Dialog Box

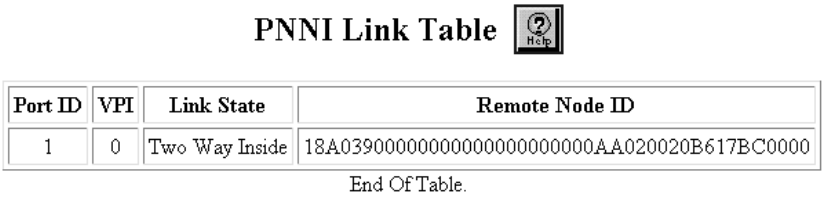


Table 3-16. PNNI Link Parameters

Parameter	Definition
Port ID	Displays the physical port ID.
VPI	Displays the virtual path indicator. The valid range is 0 - 255.
Link State	Displays the state of the hello protocol exchanges over this link. Options include: • **Not Applicable** • **Down** - Initial state • **Attempt** - Either no hellos or mismatched hellos are received from the neighbor. • **One Way Inside** - Hellos are received from the neighbor with same Peer Group ID but the Remote Node ID and Remote Port ID fields are zeros. • **Two Way Inside** - Hellos are received from the neighbor with same Peer Group ID and correct Remote Node ID and Remote Port ID fields.

Table 3-16. PNNI Link Parameter

Parameter	Definition
Link State (continued)	• **One Way Outside -** Hellos are received from the neighbor with different Peer Group IDs and the Remote Node ID and Remote Port ID fields are zeros. • **Two Way Outside** - Hellos are received from the neighbor with different Peer Group ID with correct Remote Node ID and Remote Port ID fields, but with nodal hierarchy list without any common Peer Group. • **Common Outside** - A common level of hierarchy was found and nodes are communicating fully. • **Unknown** - Hellos are received from an unknown source.
Remote Node ID	Displays the node identifier of the remote node on the other end of the link.

Viewing PNNI Node Information

To view PNNI node information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM module you want to view the PNNI node information for. The ATM Module Information dialog box opens (Figure 3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figure 3-3).
4. Click **Signaling Settings**. The ATM Network (Signalling Settings) dialog box opens (Figu re3-4).
5. Click **PNNI Node Table.** The PNNI Node Table dialog box opens (Figure 3-26). Table 3-17 provides information on the PNNI Node Table parameters.

*** Note:** You may have to scroll to see the PNNI option buttons.

Figure 3-26. PNNI Node Table Dialog Box

Table 3-17. PNNI Node Table Parameters

Parameter	Definition
Level	Displays the level of PNNI hierarchy at which this node exists. The valid range is 8 - 104 in 8 byte increments.
Node ID	Displays the PNNI node ID used to identify the logical PNNI node.
Peer Group Id	Displays the peer group identifier of the peer group that the node is to become a member of.
ATM Address	Displays the ATM address used by the network entity.

Viewing PNNI Map Node Information

To view PNNI Map Node information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).
2. Click **ATM** in the Type column of the ATM Uplink module you want to view the PNNI map node information for. The ATM Module Information dialog box opens (Figur e3-2).
3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figur e3-3).
4. Click **Signaling Settings**. The ATM Network (Signalling Settings) dialog box opens (Fig ure3-4).

5. Click **PNNI Map Node Table.** The PNNI Map Node Table dialog box opens (Figure 3-27). Table 3-18 provides information on the PNNI Map Node Table parameters.

   *** Note:** You may have to scroll to see the PNNI option buttons.

Figure 3-27. PNNI Map Node Table Dialog Box

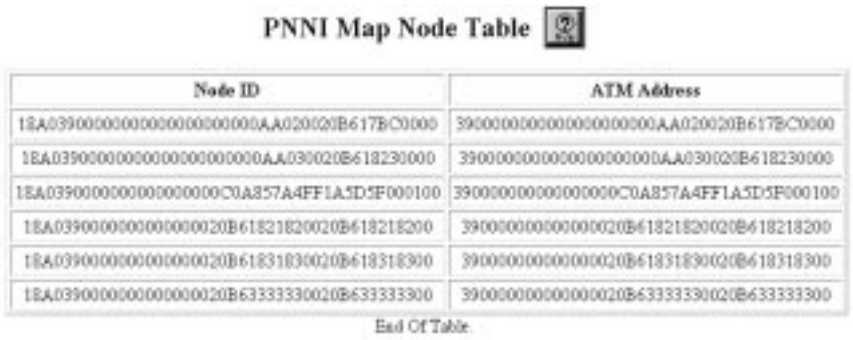


Table 3-18. PNNI Map Node Table Parameter

Parameter	Definition
Node ID	Displays the node ID.
ATM Address	Displays the end system address of the originating node. This value is 20 octet long.

Viewing PNNI Route Address Information

To view PNNI Route Address information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 3-1).

2. Click **ATM** in the Type column of the ATM Uplink module you want to view the PNNI route address information for. The ATM Module Information dialog box opens (Figu re3-2).

3. Click **Additional Configuration**. The ATM Configuration dialog box opens (Figure 3-3).

4. Click **Signaling Settings**. The ATM Network (Signalling Settings) dialog box opens (Fig ure3-4).

5. Click **PNNI Route Address Table.** The PNNI Route Address Table dialog box opens (Figur e3-28). Tabl e3-19 provides information on the PNNI Route Address Table parameters.

*** Note:** You may have to scroll to see the PNNI option buttons.

Figure 3-28. PNNI Route Address Table Dialog Box

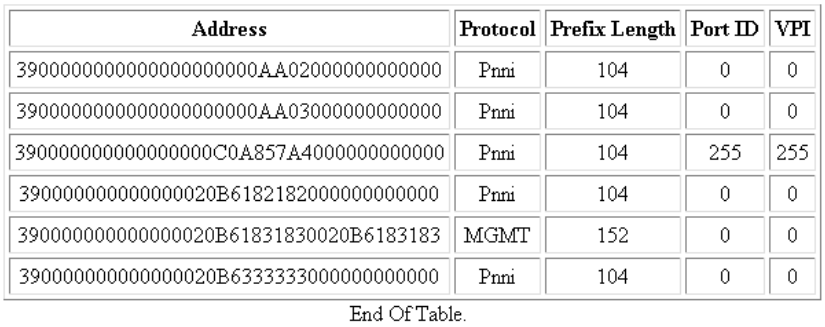


Table 3-19. PNNI Route Address Table Parameter

Parameter	Definition
Address	Displays the value of the ATM end system address prefix.
Protocol	Displays the routing mechanism from which the reachable address prefix was learned. Values are: • **Other** - Not specified • **Local** - ILMI • **MGMT** - Configured by SNMP or the Console. • **PNNI** - ATM forum PNNI.
Prefix Length	Displays the prefix length to be applied to the ATM end system address prefix.

Table 3-19. PNNI Route Address Table Parameters

Parameter	Definition
Port ID	Displays the physical port ID.
VPI	Displays the virtual path indicator. The valid range is 0 - FF (hex).

4 Configuring RFC 1483

Overview

RFC 1483 defines the use of virtual switch ports. A Virtual Switch Port (VSP) is a collection of Permanent Virtual Channels (PVCs) on the same ATM Uplink module all bound to the same VLAN. The Virtual Switch Port (VSP) takes the place of a LEC and is functionally equivalent to a LEC. For more information on RFC 1483, refer to "RFC 1483" in Chapter 1.

This chapter explains how to configure RFC 1483 only. For general configuration information, refer to Chapter 2 , “Configuring the Cajun ATM Uplink Module”. For information on configuring LANE, refer to Chapter 3, “Configuring LANE”.

*** Note:** To configure RFC 1483, you must obtain a license key packet. If you plan on configuring RFC 1483 and did not receive this packet, please contact your Avaya Sales representative.

This chapter contains the following information:

- Configuring Virtual Switch Ports
- Configuring ATM Links within Virtual Switch Ports
- Managing Permanent Virtual Channels (PVCs)
- View PVC Operational Information
- View PVC Counters

Configuring Virtual Switch Ports

This section provides information for configuring your virtual switch ports and contains the information:

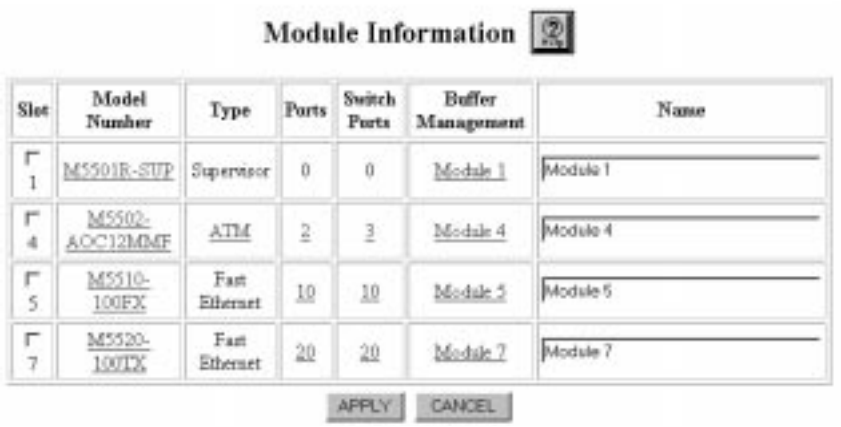
- Creating Virtual Switch Ports
- Modifying Virtual Switch Ports
- Deleting Virtual Switch Ports

Creating Virtual Switch Ports

To create virtual switch ports:

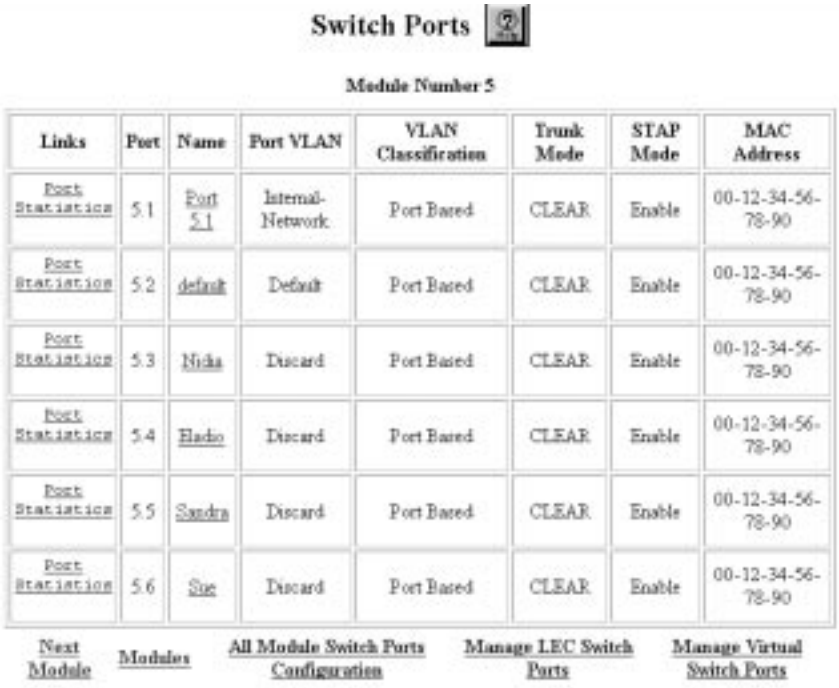
1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).

Figure 4-1. Module Information Dialog Box



2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to view the module information for. The Switch Ports dialog box opens (Figure 4-2).

Figure 4-2. Switch Ports Dialog Box



3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figure 4-3).

   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

Figure 4-3. Virtual Switch Ports Dialog Box

4. Click **Create**. The Create Virtual Switch Port dialog box opens (Figure 4-4).

Figure 4-4. Create Virtual Switch Port Dialog Box

5. Use the parameters described in Tabl e4-1 to create your virtual port.

Table 4-1. Virtual Switch Port Parameters

Parameter	Definition
Name	Enter the user-assigned name for the virtual switch port.
Type	Select the type of switch port. Options are: • Simple Bridge • LLC Bridge • Routed
Administrative Status	**Note:** This parameters appears only in the Modify Virtual Switch Port dialog box. Select the administrative status of the port. Options include: • **Enabled** - The ATM desired operational status. • **Disabled** - Forces port down.

Parameter	Definition
Packet Replication	Packet replication replicates multicasting by sending a single packet to a default VC that copies the packet to multiple PVCs. Select whether or not you want packet replication: • **Yes** - Default - Select when you have multiple links, each with a different remote ATM destination • **No** - Select if you have a single remote ATM destination. **Notes:** • This parameter is not available for UBR. • You cannot modified this parameter after the VSP is created.
Default PVC	**Notes:** • This parameter appears only in the Modify Virtual Switch Port dialog box for non-packet replicating VSPs. • Make sure you enter the PVC yo have created to use on this link. Enter the default PVC. The first number is the physical port number, the second number is the VPI number, and the third number is the VCI numbe , separated by dashes.
Load Share	Select whether you want to load share between PVCs: • Yes • No - Default

6. Click **Apply** to save your changes, or **Cancel** to restore previous settings.

Modifying Virtual Switch Ports

To modify virtual switch ports:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to modify the virtual switch ports for. The Switch Ports dialog box opens (Figure 4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figu re4-3).

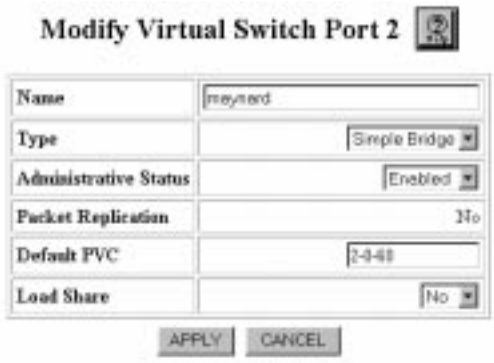
   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Select the **ID** of the virtual switch port you want to modify.
5. Click **Modify**. The Modify Virtual Switch Port dialog box opens (Figu re4-5).

   *** Notes:**

   - Make sure you enter the PVC you have created to use on this link in the Default PVC field.
   - If Packet Replication is turned on, then the Default PVC is not displayed.

Figure 4-5. Modify Virtual Switch Port Dialog Box



6. Use the parameters described in Tabl e4-1 to modify your virtual port.

7. Click **Apply** to save your changes, or **Cancel** to restore previous settings.

Deleting Virtual Switch Ports

To delete virtual switch ports:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).

2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to delete the virtual switch ports from. The Switch Ports dialog box opens (Figure 4-2).

3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figure 4-3).

   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Select the **virtual switch port in the ID column** you want to delete.

5. Click **Delete**. The Delete Virtual Switch Port dialog box opens.

   *** Note:** In order to delete the VSP,you must administratively disable it.

6. Click **Yes** to delete the virtual switch port, or **No** to restore the previous settings.

Configuring ATM Links within Virtual Switch Ports

An ATM link is the equivalent of a LANE ATM destination and maps to a channel descriptor table record. Each ATM link has space for eight VC entries to support priority based QoS in RFC 1483 mode. If any ATM Link entry is NULL, packets tagged at the priority level of that entry for MAC addresses learned on the VCs of that ATM Link are discarded. Each entry in the ATM Link should represent a VC that terminates at the same remote interface. However, there is no enforcement of this restriction and you may configure the ATM Link so frames are forwarded to different remote interfaces or the Multicast VC. The ATM Link's entries may contain the same VC or a combination of VCs. Each ATM Uplink module supports a maximum of 16,000 ATM links.

This section provides the information you need to configure AT links for your virtual switch ports. It contains the following information:

- Creating ATM Links within Virtual Switch Ports
- Modifying ATM Links for Virtual Switch Ports
- Deleting ATM Links for Virtual Switch Ports

Creating ATM Links within Virtual Switch Ports

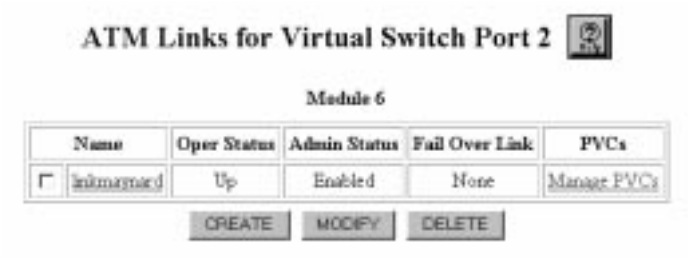
To create an ATM link:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to create ATM links for. The Switch Ports dialog box opens (Figur e4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figu re4-3).

   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click **Manage Links** in the ATM Links column. The ATM Link for Virtual Switch Port <#> dialog box opens (Figure 4-6).

Figure 4-6. ATM Links for Virtual Switch Port <#> Dialog Box



5. Click **Create**. The Create ATM Link for Virtual Switch Port <#> dialog box opens.
6. Enter the user-assigned **name** for the ATM Link.
7. Click **APPLY** to save changes, or **CANCEL** to restore the previous settings.

Modifying ATM Links for Virtual Switch Ports

To modify ATM links:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to modify the ATM links for. The Switch Ports dialog box opens (Figure 4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figure 4-3).

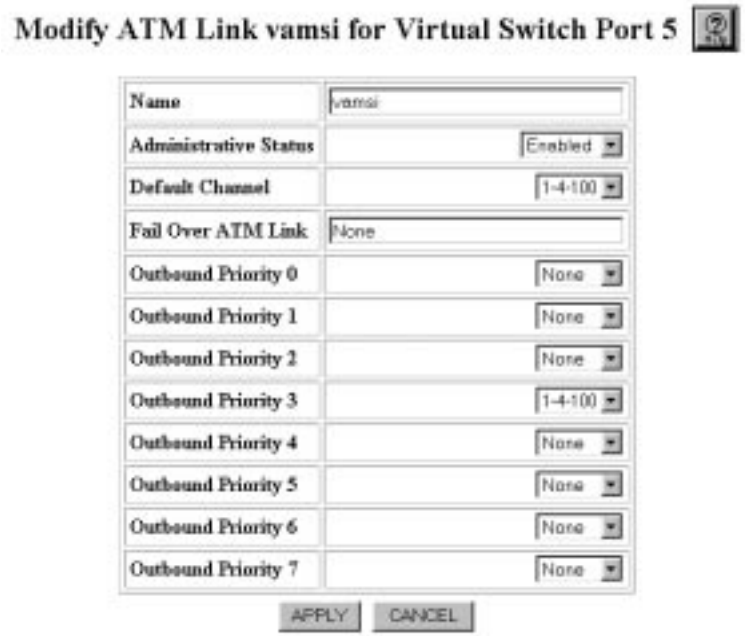
   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click **Manage Links** in the ATM Links column of the virtual switch port link you want to modify. The ATM Link for Virtual Switch Port <#> dialog box opens (Figur e4-6).
5. Select the **ATM Link** in the Name column of the ATM Link for Virtual Switch port <#> you want to modify.

6. Click **Modify**. The Modify ATM Link <name> for Virtual Switch Port <#> dialog box opens (Figu re4-7).

*** Note:** The Default Channel field does not appear for Non-Packet Replication VSPs.

Figure 4-7. Modify ATM Link <name> for Virtual Switch Port <#> Dialog Box



7. Use the parameters described in Tabl e4-2 to modify your ATM Link information.

Table 4-2. ATM LInk for Virtual Switch Port Parameters

Parameter	Description
Name	Enter the user-defined name for the ATM Link.
Administrative Status	Select the administrative status of the port. Options include: • **Enabled** - The ATM desired operational status. • **Disabled** - Forces port down.
Default Channel	Select the Default Channel for packet replicating VSPs from the pull-down menu. **Note:** If you have turned on packet replication, do not use UBR.
Fail Over ATM Link	This parameter is not supported in this release.
Outbound Priority	Select the outbound priority from the pull down menu. **Note:** It is recommended that you select a priority level. If you select None, the Priority Level will be dropped without notification.

8. Click **APPLY** to save changes, or **CANCEL** to restore the previous settings.

Deleting ATM Links for Virtual Switch Ports

To delete ATM Links:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to delete ATM links from. The Switch Ports dialog box opens (Figur e4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figure 4-3).

*** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click **Manage Links** in the ATM Links column of the virtual switch port link you want to delete. The ATM Link for Virtual Switch Port <#> dialog box opens (Figu re4-6).

5. Select the **ATM Link** in the Name column you want to delete.

6. Click **Delete**. The Delete ATM Link dialog box opens.

   *** Note:** To delete the ATM Link Admin Status, you must disabled it.

7. Click **Yes** to delete the ATM Link, or **No** to restore the previous settings.

Managing Permanent Virtual Channels (PVCs)

You can manage the traffic on your ATM network with Permanent Virtual Channels, similar to QoS in LANE.

To manage PVCs:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).

2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to manage PVCs on. The Switch Ports dialog box opens (Figure 4-2).

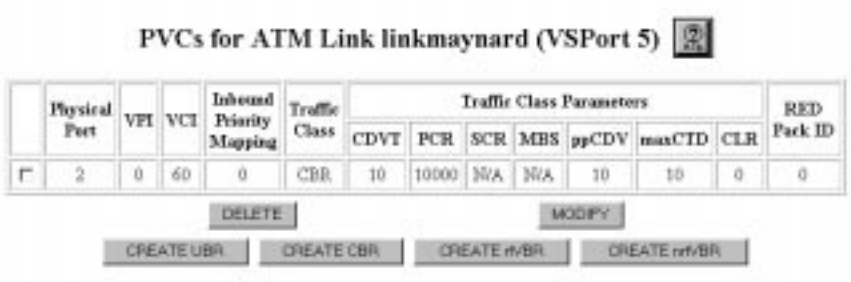
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figu re4-3).

   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click **Manage Links** in the ATM Links column of the virtual switch port you want to manage. The ATM Link for Virtual Switch Port <#> dialog box opens (Figu re4-6).

5. Click **Manage PVCs** in the PVCs column for the ATM Link you want to manage the PVCs for. The PVCs for ATM Link <xxx> dialog box opens (Figur e4-8).

Figure 4-8. PVCs for ATM Link <xxx> Dialog Box



6. Complete **one** of the following:

*** Note:** You must disable the ATM Link Admin Status to create, delete, or modify PVCs. After changing the parameters, change the ATM Link Admin Status state to **Enabled** in order for the changes to take effect.

— Click **DELETE** to remove the selected PVC. The Delete PVC dialog box opens. Refer to "Deleting Permanent Virtual Channels", later in this chapter.

— Click **MODIFY** to change the selected PVC. Refer to "Modifying Permanent Virtual Channels", later in this chapter.

— Click **CREATE UBR** to create a UBR PVC class set. Refer to "Creating a PVC Class Set", later in this chapter for more information.

— Click **CREATE CBR** to create a CBR PVC class set. Refer to "Creating a PVC Class Set", later in this chapter for more information.

— Click **CREATE rtVBR** to create a rtVBR PVC class set. Refer to "Creating a PVC Class Set", later in this chapter for more information.

— Click **CREATE nrtVBR** to create a nrtVBR PVC class set. Refer to "Creating a PVC Class Set", later in this chapter for more information.

Deleting Permanent Virtual Channels

To delete a PVC:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to delete PVCs from. The Switch Ports dialog box opens (Figu re4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figu re4-3).

   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click **Manage Links** in the ATM Links column of the virtual switch port you want to delete the PVC from. The ATM Link for Virtual Switch Port <#> dialog box opens (Figu r e4-6).
5. Click **Manage PVC**s in the PVCs column for the ATM Link you want to manage the PVCs for. The PVCs for ATM Link <xxx> dialog box opens (Figur e4-8).
6. Select the **PVC** you want to delete.
7. Click **Delete**. The Delete PVC dialog box opens.

   *** Note:** The dialog box lists the PVC by number rather by name.

8. Click **YES** to remove the PVC or click **NO** to retain the PVC.

Modifying Permanent Virtual Channels

To modify PVCs:

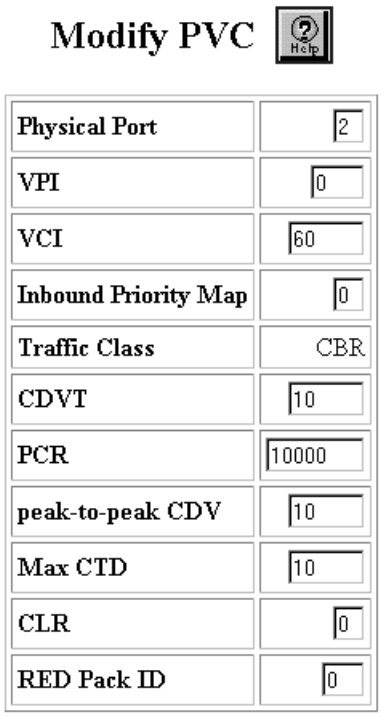
1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to modify the PVCs for. The Switch Ports dialog box opens (Figu re4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figure 4-3).

   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click **Manage Links** in the ATM Links column. The ATM Link for Virtual Switch Port <#> dialog box opens (Figure 4-6).
5. Click **Manage PVCs** in the PVCs column, for the ATM Link you want to manage the PVCs for. The PVCs for ATM Link <xxx> dialog box opens (Figure 4-8).
6. Select the **PVC** you want to modify.
7. Click **Modify**. The Modify PVC dialog box opens (Figu re4-9).

   *** Note:** The Modify PVC dialog box varies, depending on the traffic class of the PVC (CBR, UBR, nrtVBR, or rtVBR).

Figure 4-9. Modify PVC Dialog Box



8. Use the parameters described in Tabl e4-3 to modify your PVC.

9. Click **APPLY** to save changes or click **CANCEL** to exit the Modify PVC dialog box without saving changes.

Table 4-3. PVC Parameters

Parameter	Definition
Physical Port	Enter the number of the Physical Port.
VPI	Enter the number of the VPI (Virtual Path Identifier). The valid range is 0 - 255.
VCI	Enter the number of the VCI (Virtual Channel Identifier). The valid range is 32 - 65535.

Parameter	Definition
Inbound Priority Map	Enter the priority to be assigned to frames received on this PVC as they are passed onto the local VLAN segment. The valid range is 0 - 7.
Traffic Class	**Note:** This is a non-editable field for information only. Displays the traffic class for the set you are creating. Values include: • **UBR** - Unspecified bit rate which is characterized in terms of Cell Delay Variation Tolerance (CDVT), and Peak Cell Rate (PCR). • **CBR** - Constant bit rate. This class is used by a connection that requests a static amount of bandwidth that is continuously available during the lifetime of the connection. This amount of bandwidth is characterized in terms of PCR, maxCTD, peak-to-peak CDV, CLR, and Cell Delay Variation Tolerance (CDVT). • **rtVBR** - Real-time variable bit rate. This class is intended for real-time applications (voice and video). rtVBR connections are characterized in terms of PCR, SCR, Maximum Cell Transfer Delay (maxCTD), peak-to-peak Cell Delay Variation (CDV), CLR, and MBS. • **nrtVBR** - Non-real-time variable bit rate. This class is intended for non-real-time applications that have bursty traffic characteristics and are characterized in terms of PCR, Sustainable Cell Rate (SCR), Cell Loss Ratio (CLR), Maximum Burst Size (MBS), and Cell Delay Variation Tolerance (CDVT).

Parameter	Definition
CDVT	Enter the Cell Delay Variation Tolerance. When cells from two or more connection are multiplexed, cells of a given connection may be delayed. Simultaneously, cells of another connection are being inserted at the output of the multiplexer. Some randomness may affect the inter-arrival time between consecutive cells of a connection. The upper boundary on this delay is the CDVT
PCR	Enter the Peak Cell Rate. This is a traffic parameter specifying an upper bound on the rate at which traffic can be submitted on an ATM connection. The unit of measurement is cells/second. The valid range is 100 - 1412830.
SCR	Enter the Sustainable Cell Rate. This traffic parameter specifying an uppe bound on the average rate of the conforming cells of an ATM connection. The unit of measurement is cells/second. The valid range is 50 - 1412829. **Note:** This parameter is not available for UBR or CBR.
MBS	Enter the Maximum Burst Size. This traffic parameters specifies the maximum number of cells allowed to arrive on a connection in excess of the PCR which is permitted without being dropped. The valid range is 2 - 1048576. The default is 100. **Note:** This parameter is not available for UBR or CBR.
peak-to-peak CD	Enter the Peak-to-Peak Cell Delay Variation. The valid range is dependent on the ATM switch configuration. The valid range is 0 - 10000 (in milliseconds). **Note:** This parameter is not available for UBR or nrtVBR.

Parameter	Definition
max CTD	Enter the maximum Cell Transfer Delay. This traffic parameter specifies the maximum delay beyond which the cells will either be delivered late or lost. The valid range is 0 - 10000 (in milliseconds). **Note:** This parameter is not available for UBR or nrtVBR.
CLR	Enter the Cell Loss Ratio. This traffic parameter specifies the CLR for cells sent that do not conform to a traffic contract (or a UBR connection) that is not guaranteed. The valid range is between 0 and 1. Zero indicates that no cells will be dropped. **Note:** This parameter is not available for UBR.
RED Pack ID	Enter the RED Pack ID. Valid range is 1-4. Refer to "Configuring RED Pack Parameters" in Chapter 2 for more information on RED Pack parameters. *** Note:** This parameter is not available for UBR.

Creating a PVC Class Set

There are four different PVC class sets. They are similar to QoS Sets in LANE.

- **UBR** (Unspecified Bit Rate) - Allows any amount of data up to a specified maximum to be sent across the network, but there are no guarantees in terms of delivery, file transfer, ethernet connectivity, cell loss rate or delay.
- **CBR** (Constant Bit Rate) - Used for connections that depend on precise clocking to ensure undistorted delivery.
- **rtVBR** (real-time Variable Bit Rate) - Used for connections in which there is a fixed timing relationship between samples. This is a service category intended for time dependent, real-time applications (voice and video) with variable bandwidth.
- **nrtVBR** (non-real-time Variable Bit Rate) - Used for connections in which there is no fixed timing relationship between samples, but that still need a guaranteed connection. This service category is intended for non-real-time applications with variable traffic, guaranteed delivery, but not dependent on time.

To create a PVC class set:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to create a PVC class set for. The Switch Ports dialog box opens (Fig ure4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figu re4-3).

   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click **Manage Links** in the ATM Links column. The ATM Link for Virtual Switch Port <#> dialog box opens (Figure 4-6).
5. Click **Manage PVCs** in the PVCs column for the ATM Link you want to manage the PVCs for. The PVCs for ATM Link <xxx> dialog box opens (Figur e4-8).

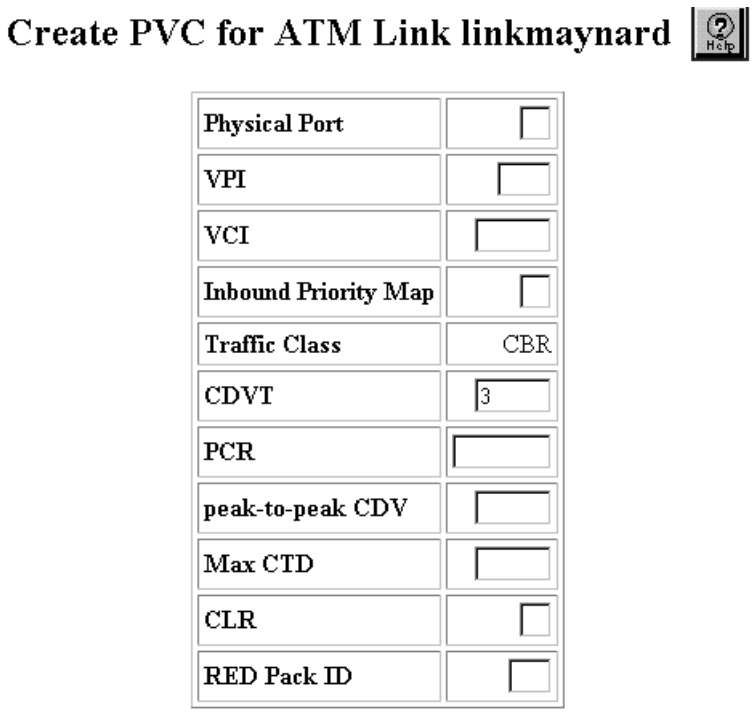
6. Click **one** of the following:

   - Create UBR
   - Create CBR
   - Create rtVBR
   - Create nrtVBR

   The Create PVC for ATM Link <xxx> dialog box opens (Figure 4-10).

   *** Note:** The Create PVC dialog box may vary slightly, depending on the PVC traffic class set (CBR is shown) you chose to create.

Figure 4-10. Create PVC for ATM Link <xxx> Dialog Box



7. Use the parameters described Tabl e4-3 to create your PVC class set.

8. Click **APPLY** to save your changes or click **CANCEL** to exit the Create PVC dialog box without saving changes.

View PVC Operational Information

To view the PVC operational information:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to view the PVC operational information of. The Switch Ports dialog box opens (Figu re4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figu re4-3).

   *** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click the **name of the virtual switch port** in the Name column you want to view the operational information for The Virtual Switch Port <xxx> Operational Information dialog box opens.

   This dialog box lists the number of Learned MAC address and the default PVC. To view the Learned MAC addresses, click the number next to Learned MAC Addresses. The Virtual Switch Port <#>, Learned MAC Addresses dialog box opens, listing the learned MAC addresses.

View PVC Counters

PVC counters keep track cells and packets as they are transmitted and received. To view the PVC counters:

1. Select **Modules & Ports > Configuration** from the Web Agent. The Module Information dialog box opens (Figure 4-1).
2. Click **the number of the switch port** in the Switch Ports column of the ATM Uplink module you want to view the PVC counters for. The Switch Ports dialog box opens (Figure 4-2).
3. Click **Manage Virtual Switch Ports**. The Virtual Switch Ports dialog box opens (Figu re4-3).

*** Note:** You may have to scroll down to see the Manage Virtual Switch Ports link.

4. Click **Manage Links** in the ATM Links column. The ATM Link for Virtual Switch Port <#> dialog box opens (Figure 4-6).

5. Click the **name of the ATM Link** in the Name column. The Active PVCs for ATM Link <xxx> dialog box opens (Figure 4-11).

Figure 4-11. Active PVCs for ATM Link <xxx>

Active PVCs for ATM Link linkashland (VSPort 7)

Link	Physical Port	VPI	VCI	Priority	Default PVC
Statistics	1	0	100	0	No
Statistics	1	0	90	1	No
Statistics	1	0	102	2	No
Statistics	1	0	103	3	No

6. Click **Statistics** in the Link column for the PVC you want to view counters for. The PVC <xxx> Counters for ATM Link <xxx> dialog box opens (Figure 4-12). Table 4-4 describes the parameters.

Figure 4-12. PVC <xxx> Counters for ATM Link <xxx> Dialog Box

PVC 1-0-35 Counters for ATM Link linkstow (VSPort 3)

	Recieved	Transmitted
Cells	0	56,895
Packets	0	27,897
Dropped Packets	0	0

Refresh

Table 4-4. PVC Counters Parameters

Parameter	Description
Cells	The number of ATM cells received and/or transmitted.
Packets	The number of Ethernet packets received and/or transmitted.
Dropped Packets	The number of Ethernet packets dropped.

Glossary

ACM - ATM Connection Manager

A software entity within each device that is responsible for setting up and maintaining ATM virtual channel connections.

Address Resolution Protocol (ARP)

A protocol used to map 32-bit IP addresses into 48-bit Ethernet addresses. Conforms to RFC 826.

Asynchronous Transfer Mode (ATM)

A high-speed, connection-oriented switching and multiplexing technology that uses 53-byte cells (5-byte header, 48-byte payload) to transmit different types of traffic simultaneously, including voice, video, and data. It is asynchronous in that information streams can be sent independently without a common clock.

ATM Adaptation Layer (AAL)

A set of four standard protocols that translate user traffic from the higher layers of the protocol stack into a size and format that can be contained in the payload of an ATM cell and return it to its original form at the destination. Each AAL consists of two sublayers: the Segmentation And Reassembly (SAR) sublayer and the convergence sublayer. Each is geared to a particular class of traffic, with specific characteristics concerning delay and cell loss. All AAL functions occur at the ATM endstation rather than at the switch.

AAL 1 addresses CBR (Constant Bit Rate) traffic, such as digital voice and video and is used for applications that are sensitive to both cell loss and delay and to emulate conventional leased lines. It requires an additional byte of header information for sequence numbering, leaving 47 bytes for payload.

AAL 2 is used with time-sensitive VBR (Variable Bit Rate) traffic, such as packetized voice. It allows ATM cells to be transmitted before the payload is full to accommodate an application's timing requirements. The AAL 2 specification has not been completed by the ATM Forum.

	AAL 3/4 handles bursty connection-oriented traffic, like error messages, or variable rate connectionless traffic, such as LAN file transfers. It is intended for traffic that can tolerate delay but not cell loss. To ensure that cell loss is kept to a minimum, AAL 3/4 performs error detection on each cell and uses a sophisticated error-checking mechanism that consumes four (4) bytes of each 48-byte payload. AAL 3/4 allows ATM cells to be multiplexed.
ATM Adaptation Layer (AAL) continued	AAL 5 accommodates bursty LAN data traffic with less overhead than AAL 3/4. Also known as the Simple And Efficient Adaptation Layer (SEAL), AAL 5 uses a conventional five-byte header. It does not support cell multiplexing.
ATM Address	Consists of 20 bytes. Addressing is hierarchical, as in a phone network, using prefixes similar to area codes and exchanges. ATM switches share address information with attached endstations and maintain endstation addresses in routing tables.
ATM Address Resolution Protocol (ATMARP)	Maps IP addresses to ATM hardware addresses. The process works in much the same way as conventional ARP works when mapping network-layer addresses to addresses at the MAC (Media Access Control) layer.
ATM Forum	Organization that develops and defines ATM standards. Principal members participate in committees and vote on specifications. http://www.atmforum.com
ATM Forum LAN Emulation	Provides connectivity between LAN-attached endstations and devices, and ATM-attached endstations and devices.
Authenticator	The end of the link requiring the authentication. The authenticator specifies the authentication protocol to be used in the Configure-Request during Link Establishment phase.
Available Bit Rate (ABR)	A class of service in which the ATM network makes a “best effort” to meet the traffic’s bit-rate requirements. ABR requires the transmitting endstation to assume responsibility for data that canno get through, and does not guarantee delivery.
Bandwidth	The difference in Hertz (Hz) between the highest and lowest frequencies of a transmission channel. Usually identifies the amount of data that can be sent through a given circuit.
Best Effort	A Quality of Service (QoS) class in which no traffic parameters are specified and no guarantee is given that traffic will be delivered. ATM’s Available Bit Rate (ABR) and Unspecified Bit Rate (UBR) are both “best effort” services.

BOOTP	The IETF's boot protocol that lets an IP endstation acquire its I address and boot file from a server. Defined by RFC 951.
BOOTP Relay Agent	A software entity within each device that captures BOOTP requests and responses, and forwards them appropriately. Defined by RFC 1532.
Broadcast Frame	An Ethernet frame transmitted with a broadcast destination address; it is intended to be received by all endstations. In this documentation, a broadcast frame is considered a multicast frame.
Broadcast and Unknown Server (BUS)	Handles data sent by a LAN Emulation Client (LEC) to the broadcast MAC address. This includes all multicast traffic, and initial unicast frames that are sent by a LAN emulation client before the data direct target ATM address is resolved (before a data direct VCC is established).
Cell	An ATM cell consists of 53 bytes or "octets." Of these, five constitute the header; the remaining 48 carry the data payload.
Cell Loss Priority (CLP) Field	A priority bit in the cell header. When set, it indicates that the cell can be discarded, if necessary.
Challenge-Handshake Authentication Protocol (CHAP)	The Challenge-Handshake Authentication Protocol (CHAP) is used to periodically verify the identity of the peer using a 3-way handshake. This is done upon initial link establishment, and MAY be repeated anytime after the link has been established.
Classical IP and ARP over ATM (CLIP)	An adaptation of TCP/IP and its Address Resolution Protocol (ARP) for ATM, defined by the IETF (Internet Engineering Task Force) in RFCs (Requests for Comments) 1483 and 1577. It places IP packets and ARP requests directly into PDUs (Protocol Data Units) and converts them into ATM cells. Classical IP does *not* recognize conventional MAC layer protocols such as Ethernet or Token Ring.
Command Line Interface (CLI)	Character-based command line interface.
Common Part Convergence Sublayer (CPCS)	The portion of the convergence sublayer of an AAL that remains the same, regardless of the type of traffic.

Connection Admission Control (CAC)

Two mechanisms used to control the setup of virtual circuits. Overbooking, which allows one connection to exceed permissible traffic limits, assumes that other active connections are not using the maximum available resources. Full booking limits network access, once maximum resources are committed, and only adds connections that specify acceptable traffic parameters.

Console Interface

The local RS-232 ASCII interface on each Cajun unit.

Constant Bit Rate (CBR)

Digital information, such as video and digitized voice, that must be represented by a continuous stream of bits. CBR traffic requires guaranteed throughput rates and service levels.

Cyclic Redundancy Check (CRC)

A mathematical algorithm that computes a numerical value based on the bits contained in a block of data.

Device Type

Model of the Cajun system.

Dynamic Host Configuration Protocol (DHCP)

A superset of the BOOTP protocol. The two major differences between DHCP and BOOTP are:

- DHCP defines mechanisms through which clients can be assigned a network address for a fixed lease, allowing for serial reassignment of network addresses to different clients.
- DHCP provides the mechanism for a client to acquire all of the IP configuration parameters that it needs to operate. Defined by RFC 1531.

Emulated LAN (ELAN)

A collection of ATM endstations assigned to a particular virtual LAN.

Endstation

A MAC-level entity that is the source or destination of an Ethernet frame.

Endstation Identifier (ESI)

Endstation identifier.

ESID

LAN Emulation Client (LEC) endstation ID.

Ethertype

A 16-bit identifier carried within an Ethernet frame to uniquely identify its protocol type.

Flash Memory

Non-volatile random access memory that can be written to and read from.

Flood Frame	A unicast frame sent to all devices in the network; it is intended for an endstation whose physical location has yet to be learned.
Generic Flow Control (GFC) Field	Four priority bits in an ATM header. The default setting (four zeros) indicates that the cell is uncontrolled, meaning that it does not take precedence over another cell when contending for a virtual circuit. Setting any of the bits in the GFC field tells the target endstation tha the switch can implement some form of congestion control. The endstation echoes this bit back to the switch to confirm that it can set priorities. The switch and endstation can use the GFC field to prioritize voice over video, for example, or indicate that both voice and video take precedence over other types of data.
Header	The five bytes in an ATM cell that supply addressing and control information, including generic flow control, virtual path identifier, virtual circuit identifier, payload type, and cell-loss priority.
Header Error Control (HEC)	The last one-byte field in an ATM cell's five-byte header. The HEC field contains information that is used to detect and correct errors in the cell header. These types of errors are likely to corrupt addressing fields, causing the network to deliver the cell to the wrong destination or drop the cell and request retransmission.
Internet EngineeringTask Force (IETF)	The technical organization that establishes specifications and standards for the Internet.
Internet Group Management Protocol (IGMP)	A protocol that allows the network to locate group members via querying. Also enables endstations to join and leave the multicast group.
Interim Interswitch Protocol (IISP)	A signaling protocol that allows inter-switch connectivity in private networks, in a multivendor environment.
Interim Local Management Interface (ILMI)	Supports bidirectional exchange of management information between UNI Management Entities (UMEs) related to UNI ATM layer and physical layer parameters.
IPmc	IP multicast is a set of IETF specifications that support user-defined multicast groups.
LAN Emulation (LANE)	An ATM Forum method for bridging Ethernet and Token Ring traffic over ATM, to provide multivendor networking. LANE defines a standard interface between edge devices and the ATM backbone. LANE operates at layer-2 of the OSI model, and supports all LAN protocols.

LAN Emulation Client (LEC)	Allows communication from endstations directly to the device to participate in LANE with ATM-connected devices.
LAN Emulation Configuration Server (LECS)	Gives a LEC its configuration parameters at the beginning of LANE participation. Also provides predefined values for all configuration parameters.
LAN Emulation Server (LES)	Registers (learns) LANE-connected endstations. Also resolves MAC addresses to ATM addresses.
LAN Emulation Network-to-Network Interface (LNNI)	Enables one vendor's implementation of LAN emulation to work with another's. This specification is essential for building multivendor ATM networks and is currently under development a the ATM Forum.
LAN Emulation User Network Interface (LUNI)	Defines how legacy LAN applications and protocols work with ATM. Currently in development at the ATM Forum, LUNI adapts layer 2 LAN packets to AAL 5 PDUs, which can then be divided into cells. LUNI uses a client-server architecture to resolve LAN-to-ATM addresses. A LAN Emulation Client (LEC) resides in each ATM-attached device; a LAN Emulation Server (LES) and Broadcast and Unknown Server (BUS) reside anywhere on the ATM network.
Link	A point-to-point duplex cable connection between two ATM cell switch ports. A link's ATM switch port is specified by its Cajun system's IP host name and port number.
Link Control Protocol (LCP)	Establishes, configures, and tests the data-link connection.
Local Service Advertisement Protocol (LSAP)	The local protocol for publicizing the current network address of available services.
Maximum Burst Size (MBS)	A traffic parameter that specifies the maximum number of cells that can be transmitted at ATM's Peak Cell Rate (PCR). Maximum burst size is a key measurement in capacity planning and network management.
Medium Access Control (MAC)	A sublayer of the data link layer, as defined by the IEEE 802 committee, which defines frame format and media access procedures for a particular type of LAN.
Management Information Base (MIB)	A database of information on managed objects in the Cajun syste unit that can be accessed via the SNMP network management protocol.

Multicast Frame	An Ethernet frame transmitted with a multicast destination address; it is intended to be received by one or more endstations. In this documentation, a broadcast frame is considered a multicast frame.
Multiprotocol Encapsulation Over ATM	Enables higher-layer protocols, such as IP or IPX, to be routed over ATM by enabling an ATM-aware device or application to add a standard protocol identifier to LAN data.
Multiprotocol Over ATM (MPOA)	A proposed ATM Forum specification that defines how ATM traffic is routed from one virtual LAN to another. MPOA is key to making LAN emulation, Classical IP over ATM, and proprietary virtual LAN schemes interoperate in a multiprotocol environment.
Network Control Protocols (NCPs)	Establishes and configures different network-layer protocols.
Network Interworking	A method of connecting two frame relay devices over an ATM backbone network. In network interworking, ATM devices are essentially pass-through devices; all frame relay header and payload data is preserved as is. This is in contrast to service interworking, where protocol conversion is used to connect frame relay and ATM networks. Network interworking is defined in the Frame Relay Forum's FRF.5 spec and is recognized by the ATM Forum.
Network Service Access Point (NSAP)	An OSI format defining a 20-byte format network address; also used in ATM networks. Current ATM specifications define the International Telecommunication Union's E.164 standard for public networks and NSAP for private networks, but some ATM users and vendors want to standardize on NSAP addresses for all devices. The NSAP format includes a 13-byte address prefix that can be used to describe a specific location (including country, area, and end system).
Network-to-Network Interface (NNI)	Interface between ATM network nodes (switches) defined in the ATM Forum's UNI (User Network Interface).
OAM	Operations Administration and Maintenance (OAM).
Optical Carrier (OC-n)	Fundamental unit of the SONET (Synchronous Optical Network) hierarchy. OC indicates an optical signal and n represents increments of 51.84 Mbits. Thus, OC-1, OC-3, and OC-12 equal optical signals of 51, 155,and 622 Mbits, respectively.
Organization Unique Identifier (OUI)	The most significant 24-bits of an endstation's MAC address; contains the vendor ID name assigned by the IEEE.

Packet Replication	Replicates multicasting by sending a single packet to a default VC that copies the packet to multiple PVCs.
Password Authentication Protocol (PAP)	The Password Authentication Protocol (PAP) provides a simple method for the peer to establish its identity using a 2-way handshake. This is done only upon initial link establishment.
Partition	A physical subdivision of a virtual LAN; it is specified by the assignment of LAN segments.
Payload	Information portion of an ATM cell, exclusive of header. ATM cells typically have 48-byte payloads, but size can vary, depending upon data type.
Peak Cell Rate (PCR)	The maximum rate at which cells can be transmitted across a virtual circuit, specified in cells per second and defined by the interval between the transmission of the last bit of one cell and the first bit of the next.
Peer	The other end of the point-to-point link; the end which is being authenticated by the authenticator.
Permanent Virtual Circuit (PVC)	A virtual link with fixed end-points that are defined by the network manager. A single virtual path may support multiple PVCs.
Physical Layer Convergence Protocol (PLCP)	A protocol specified within the TC sublayer that defines how cells are formatted within a data stream for a particular transmission facility, such as T1, T3, or OC-n.
Physical Layer (PHY)	The bottom layer of the ATM protocol stack, which defines the interface between ATM traffic and the physical media. The PHY consists of two sublayers: the Physical Medium-Dependent (PMD) sublayer and the Transmission Convergency (TC) sublayer.
Policy	A set of rules that control an endstation's access to other segments in the backbone network.
Point to Point Protocol (PPP)	A protocol used to exchange IP frames (and others) over a serial link. The Point-to-Point Protocol is designed for simple links which transport packets between two peers. These links provide full-duplex simultaneous bi-directional operation, and are assumed to deliver packets in order.
Private Network-to-Network Interface (PNNI)	A routing information protocol that allows different vendors' ATM switches to be integrated in the same network. PNNI automatically and dynamically distributes routing information, enabling any switch to determine a path to any other switch.

Protocol Data Unit (PDU)

A discrete piece of information (such as a packet or frame) in the appropriate format to be segmented and encapsulated in the payload of an ATM cell.

Protocol Type

A field in an Ethernet frame that specifies the network-layer protocol being used in the frame.

Quality of Service (QoS) Classes

Consists of the following five broad categories outlined by the ATM Forum:

- Class 1 specifies performance requirements and indicates tha ATM's quality of service should be comparable with the service offered by standard digital connections.
- Class 2 specifies necessary service levels for packetized video and voice.
- Class 3 defines requirements for inter-operability with other connection-oriented protocols, particularly Frame Relay
- Class 4 specifies inter-operability requirements for connectionless protocols, including IP, IPX, and SMDS (Switched Multimegabit Data Service).
- Class 5 is effectively a "best effort" attempt at delivery; it is intended for applications that do not require a particular class of service.

Reverse Address Resolution Protocol (RARP)

A protocol defined by RFC 903 that allows an endstation to acquire its IP address from a server attached to the local segment.

RFC (Remote Function Call)

An API (application program interface) is the specific method prescribed by a computer operating system or by another application program by which a programmer writing an application program can make requests of the operating system or another application.

RFC (Request For Comments)

An RFC (Request for Comments) is an Internet formal document or standard that is the result of committee drafting and subsequent review by interested parties. Some RFCs are informational in nature. Of those that are intended to become Internet standards, the final version of the RFC becomes the standard and no further comments or changes are permitted. Change can occur, however, through subsequent RFCs that supersede or elaborate on all or part of previous RFCs.

Segment	An Ethernet connection with one or more endstations attached to it, or an ATM link to an endstation operating as an ATM Forum LAN Emulation client. A segment is specified by its device's IP host name and port number.
Segmentation and Reassembly (SAR) Sublayer	Converts PDUs into appropriate lengths and formats them to fit the payload of an ATM cell. At the destination endstation, SAR extracts the payloads from the cells and converts them back into PDUs, which can be used by applications higher up the protocol stack.
Segmentation and Reassembly Protocol Data Unit (SAR-PDU)	Information that has passed through SAR and been loaded into ATM cells, ready to be forwarded to the TC sublayer of the ATM physical layer for actual transmission.
Shortest Path First Algorithm (SPF)	A routing algorithm used to determine the shortest or lowest cos path between two endpoints in a network.
Signaling	The standard process used to establish ATM point-to-point, point-to-multipoint, and multipoint-to-multipoint connections.
Signaling ATM Adaptation Layer (SAAL)	Resides between the ATM layer and the Q.2931 function. The SAAL provides reliable transport of Q.2931 messages between Q.2931 entities (ATM switch and host, for example) over the ATM layer. SAAL contains two sublayers: common part and service-specifi part.
Simple Network Management Protocol (SNMP)	An application protocol between an SNMP management application and an SNMP agent; it is based on the IP protocol.
SNMP Community String	A password that is included with each packet sent by an SNMP management station to an SNMP agent. The community string controls both the visibility and changeability of various portions of an SNMP agent's MIB.
SNMPv2	The IETF's latest version of the Simple Network Management Protocol (SNMP) which adds new features including acknowledge traps and secure sets.
Subnet	A logical subdivision within the IP internetwork architecture.
Subnet Mask	A 32-bit quantity indicating which of the least significant bits in an IP address is to be used to identify the host ID portion of the address.
Subnetwork	A logical subdivision of a network protocol's internetwork architecture, such as an IP subnet, IPX network, or DECnet area.

Sustainable Cell Rate (SCR)	Maximum throughput that bursty traffic can achieve within a given virtual circuit without risking cell loss.
Switched Virtual Circuit (SVC)	A virtual link, with variable endpoints, established through an ATM network. With an SVC, the user defines the endpoints when the call is initiated; with a PVC, the endpoints are predefined by the network manager. A single virtual path may support multiple SVCs.
T1	A digital transmission service with a basic data rate of 1.544 Mbits per second.
T3	A digital transmission service with a basic data rate of 44.736 Mbit per second for transport of 28 T1 circuits.
Transmission Convergence (TC) Sublayer	Part of the ATM physical layer, it defines a protocol for preparing cells for transmission across the physical media defined by the Physical Media-dependent (PMD) sublayer. The function of the TC sublayer differs according to physical medium.
Trivial File Transfer Protocol (TFTP)	IETF's file transfer protocol, that transfers files using UDP datagrams.
User Network Interface (UNI)	An interface point between ATM end users and a private ATM switch, or between a private ATM switch and the public carrier ATM network; defined by physical and protocol specifications per ATM Forum UNI documents. The standard adopted by the ATM Forum to define connections between user or endstations and a local switch.
Unicast frame	An Ethernet frame transmitted with a single destination address; it is intended to be received by a single destination.
Unspecified Bit Rate (UBR)	An ATM service category that does not specify traffic-related service guarantees. UBR does not include the notion of a per-connection negotiated bandwidth. No numerical commitments are made with respect to the cell loss ratio experienced by a UBR connection, or as to the cell transfer delay experienced by cells on the connection.
Variable Bit Rate (VBR)	Information that can be represented digitally by groups of bits (as opposed to streams) is characterized by a variable bit rate. Most data applications generate VBR traffic, which can tolerate delays and fluctuating throughput.
Virtual Circuit (VC)	A defined route between two endpoints in an ATM network that may traverse several virtual paths.

Virtual Channel Connection (VCC)	The end-to-end connection, either point-to-point or point-to-multipoint, between two endstations. Consists of one or more Virtual Channels (VCs) concatenated together.
Virtual Channel Identifier (VCI)	A 16-bit identifier in each ATM cell header that identifies the virtual connection associated with the cell. Each VCI value has local significance to only one ATM port in an Cajun system.
Virtual Circuit (VC)	A portion of a virtual path or virtual channel that is used to establish a single virtual connection between two endpoints.
Virtual Ethernet (VE)	A non-physical Ethernet connection created by the network between an Cajun system and an endstation, based on the endstation ID and the Cajun system node name.
Virtual Network	A network paradigm that interconnects users based on relationships instead of physical location. Physically consists of one or more virtual switches and all attached endstations. Logically consists of one or more virtual LANs.
Virtual Path	A group of virtual channels that can support multiple virtual circuits.
Virtual Path Identifier (VPI)	An 8-bit identifier in each ATM cell header that identifies the virtual path associated with the cell. Each virtual path can support up to 64K virtual channels.
Virtual Segment	Part of a network that also consists of Virtual LANs (VLANs).

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